Dräger medical
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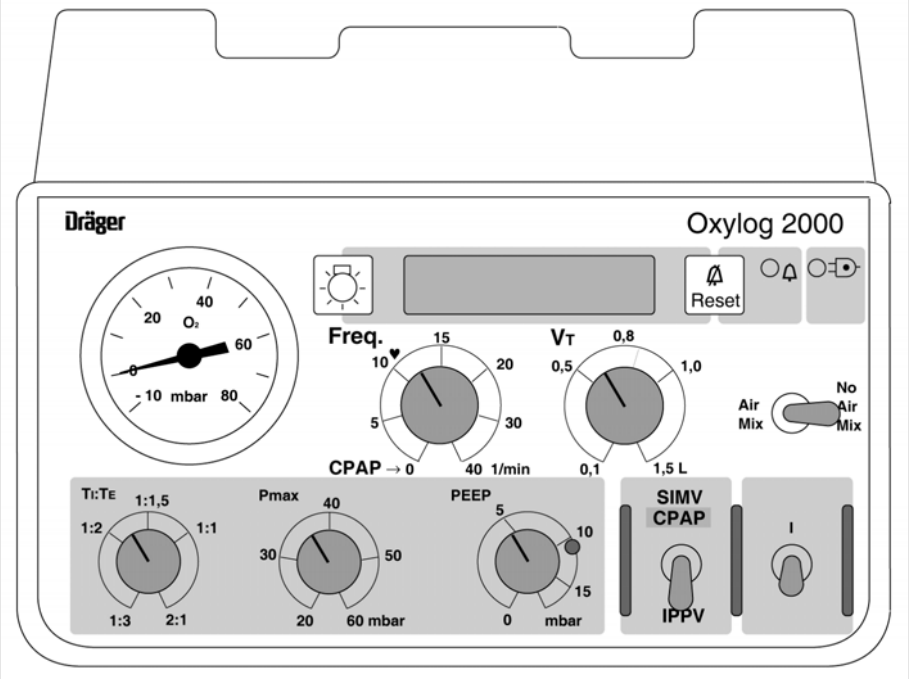
Technical Documentation

Oxylog 2000
Emergency Ventilator



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General

1 Notes

This Technical Documentation conforms to the IEC 60601-1 standard.

Read each step in every procedure thoroughly before beginning any test. Always use the proper tools and specified test equipment. If you deviate from the instructions and/or recommendations in this Technical Documentation, the equipment may operate improperly or unsafely, or the equipment could be damaged.

Use only original Dräger parts and supplies.

The maintenance procedures described in this Technical Documentation may be performed by qualified service personnel only. These maintenance procedures do not replace inspections and servicing by the manufacturer.

The information in this manual is confidential and may not be disclosed to third parties without the prior written consent of the manufacturer.

Strictly follow the Instructions for Use manual / Operating Instructions! This Technical Documentation does not replace the Instructions for Use manual / Operating Instructions. Any use of the product requires full understanding and strict observation of the product-specific Instructions for Use manual/ Operating Instructions.

Reference is hereby made to the observance of the relevant safety provisions, for example in Germany, the Medical Product Law (MPG), the Medical Device Operator Ordinance (MPBetreibV), the Pressure Container Ordinance (Druckbehälterverordnung), the Technical Rules for Pressurized Gases (Technische Regeln Druckgase), or the Occupational Health and Safety Provisions (Unfallverhütungsvorschriften).

Unless otherwise stated, reference is made to laws, regulations or standards (as amended) applicable in the Federal Republic of Germany.

Follow the laws and regulations applicable in your country.

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1.1 Symbols and Definitions

This symbol indicates a warning.

This symbol indicates tips and useful information.

This symbol is used to alert against unsafe practices when handling electrostatic sensitive devices (ESD).

Definitions according to German standard DIN 31051:

Inspection	=	examination of actual condition
Maintenance	=	measures to maintain specified condition
Repair	=	measures to restore specified condition
Servicing	=	inspection, maintenance, and repair

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Function Description

1 Intended use of Oxylog 2000

Oxylog 2000 is a time-cycled, volume-constant emergency lung ventilator for patients with a tidal volume of 100 mL or more.

For the ventilation modes:

- Controlled ventilation IPPV with variable TI:TE, adjustable 60 or 100 vol.% O2.
- Synchronized intermittent mandatory ventilation (SIMV).
- Spontaneous breathing with continuous positive airway pressure (CPAP).

With monitoring:

- Of the airway pressure (Paw).
- Of the expiratory minute volume (MV).

With monitoring:

- Of the airway pressure.
- Of the electrical power supply.
- Of the gas supply.

Areas of application:

- Mobile use in emergency care or in primary care of emergency care patients.
- During transport in emergency rescue vehicles or by helicopter.
- During transfers by road and air.
- When moving ventilated patients around the hospital.
- Use in the emergency room.
- During secondary transfers from hospital to hospital.

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1.1 Intended use of Oxylog 2000 HBO

Oxylog 2000 HBO is a time-cycled, volume-constant emergency lung ventilator for patients with a tidal volume of 100 mL or more.

For the ventilation modes:

- Controlled ventilation IPPV with variable TI:TE, adjustable 60 or 100 vol.% O2.
- Synchronized intermittent mandatory ventilation (SIMV).
- Spontaneous breathing with continuous positive airway pressure (CPAP).

With monitoring:

- Of the airway pressure (Paw).
- Of the expiratory minute volume (MV) via the Volumeter 3000 for VT and MV as firm measured variables.

With monitoring:

- Of the airway pressure.
- Of the electrical power supply.
- Of the gas supply.

Areas of application:

- Mobile use in emergency care or in primary care of emergency care patients in hyperbaric chambers. The use is restricted to the immediate area inside and outside of the HOB chamber. The Oxylog 2000 HBO is suitable for a pressure of max. 3 bar = 300 kPa absolute (20 m diving depth).

The Oxylog 2000 HBO may only be used with the patient hose system specified in the Instructions for Use manual!

2 Patient safety precautions

Monitor ventilation

During ventilation ensure the patient is continuously monitored by qualified medical personnel.

Keep manual ventilation device ready

If the life-supporting function of the lung ventilator can no longer be guaranteed on account of a fault, such as a power failure, ventilation of the patient must be continued without delay using another ventilation equipment, such as a manual ventilation bag, with PEEP and/or increased inspiratory O2 concentration if necessary.

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3 MedGV

The equipment is a Group 1 equipment according to the MedGV .

According to the MedGV § 11 safety checks must be carried out at 2-year intervals.

The device must be subjected to inspections and servicing by trained specialists (and the results logged) every 2 years.

Standards

Table 1

Type of protection	IP X4 (splash-proof)
Protection class of the power supply unit	II (as per EN 60601-1)

Manufacturer's certification on radio interference suppression

This is to certify that the Oxylog 2000 meets the radio-interference suppression specifications as per EN 55014: 1987/A2 1990 and the immunity specifications as per 89/336/EEC regulation.

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4 Some important technical data

Table 2

Control principle	Volume metering, time-cycled, volume-constant Flow chopper Spontaneous breathing with integrated demand valve (also on PEEP level)
Ventilation modes	IPPV, SIMV/CPAP
Ventilatory frequency (f)	5 to 40 1/min ± 1/min
Ventilation time ratio (TI:TE)	1:3 to 2:1 ±5 %
Tidal volume (VT)	0.1 to 1.5 L ±10 %
Minute volume (MV) (at TI:TE = 1:1.5)	min. 1.0 to max. 25.0 L/min
Inspiratory pressure limit (Pmax)	20 to 60 mbar ±10 %
PEEP	0 to 15 mbar
Operating pressure of Demanad valve	approx. –1 mbar
Flow rate at –4 mbar	approx. 120 L/min
Pressure gauge measuring range	–10 to 80 mbar ±2 mbar
Flow measuring range	2 to 120 L/min
MV measuring range	2 to 40 L/min
O2 concentration AIR MIX	 >7 L/min approx. 60 vol.% <7 L/min up to approx. 80 vol.%
NO AIR MIX	100 vol.%

For further data, refer to the Instructions for Use manual. Only the data specified in the applicable Instructions for Use manual is binding.

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5 Comparison Oxylog/Oxylog 2000

Table 3

Features	Oxylog	Oxylog 2000
Working Principle	Flow chopper pneumatically controlled	Flow chopper electronically controlled
Power supply	——	**internal:** 6 NiCd cells (7.2 VDC) max. operating duration: 10 h 800–1000 charging cycles **external:** 10–26 VDC
Equipment volume	3.2 L	4.8 L
Equipment weight	2.0 kg	<4.0 kg
Ventilation mode	IPPV (with PEEP), EPAP (with optional demand valve)	IPPV (with PEEP) SIMV/CPAP (with integrated demand valve)
PEEP setting	external PEEP valve	integrated PEEP setting
Ventilation volume	Minute volume	Tidal volume
I:E ratio	fixed	variable
O2 concentration	selectable 50 % / 100 %	selectable 50 % / 100 %
inspiratory pressure limit	fixed	variable
Respiratory pressure measurement	only inspiratory	inspiratory and expiratory
Volume measurement	——	expiratory via patient-side flow sensor
Alarms	——	Apnea Leakage Supply pressure Supply voltage

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6 Operating modes

6.1 IPPV (**I**ntermittent **P**ositive **P**ressure **V**entilation)

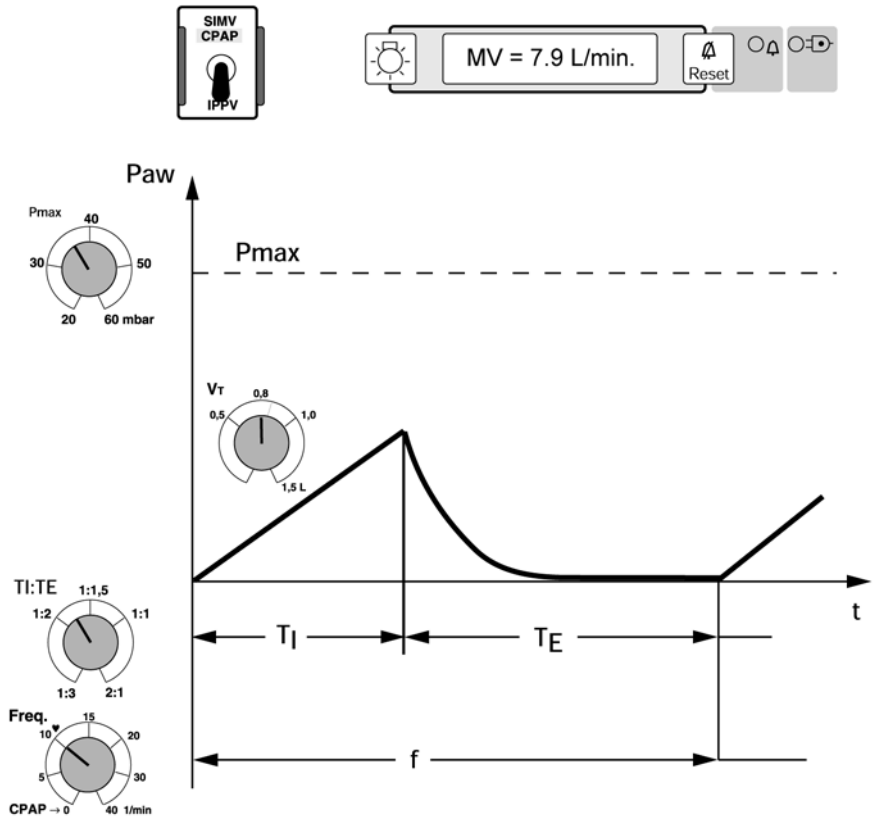

Figure 1 IPPV curve

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6.2 IPPV, Paw low alarm

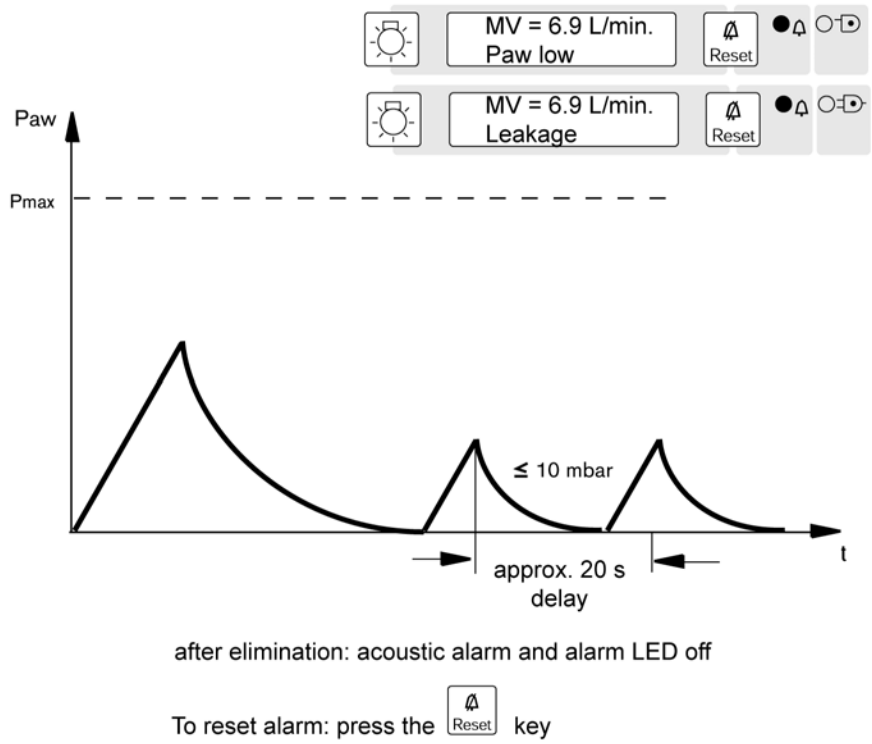

Figure 2 IPPV, Paw low alarm

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6.3 IPPV, Paw high alarm

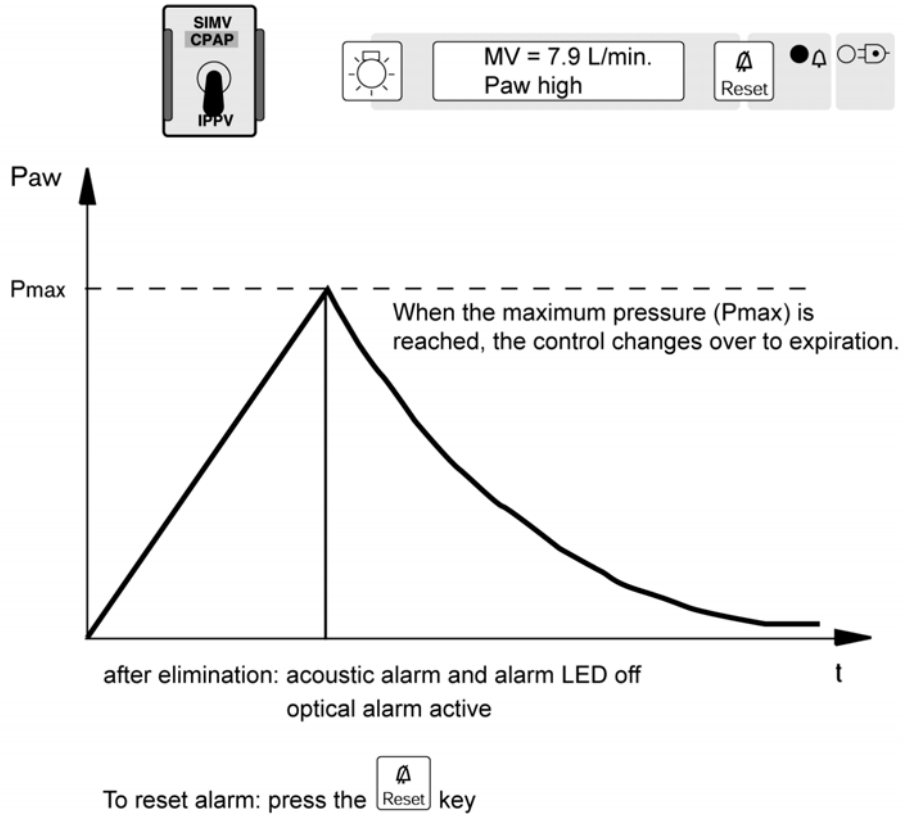

Figure 3 IPPV, Paw high alarm

If the Paw high alarm occurs, the set tidal volume VT is not delivered completely.

As of SW 3.XX it is possible to adjust the Pmax control knob to 80 mbar. This setting limits the airway pressure to max. 80 mbar without aborting the inspiration prematurely (pressure-limited ventilation). Pressure limit is signaled by one single audible alarm. The set tidal volume is not delivered completely.

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6.4 IPPV, leakage alarm

Leakage alarm

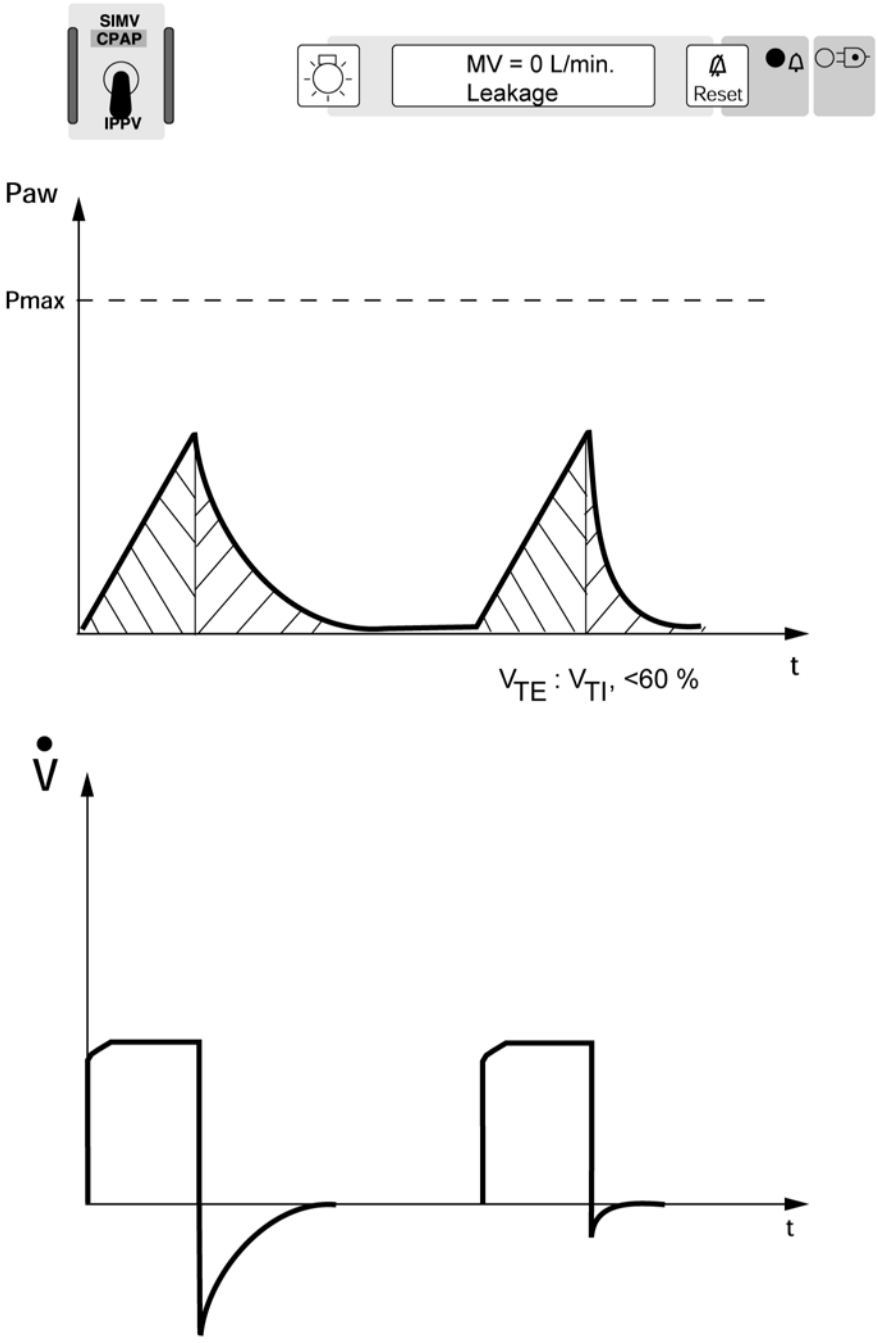

Figure 4 IPPV, leakage alarm

In this case, a VTE:VTI comparison is carried out, irrespective of the set MV and frequency.

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6.5 SIPPV (synchronized IPPV)

SIPPV mode is available as of SW 3.XX.

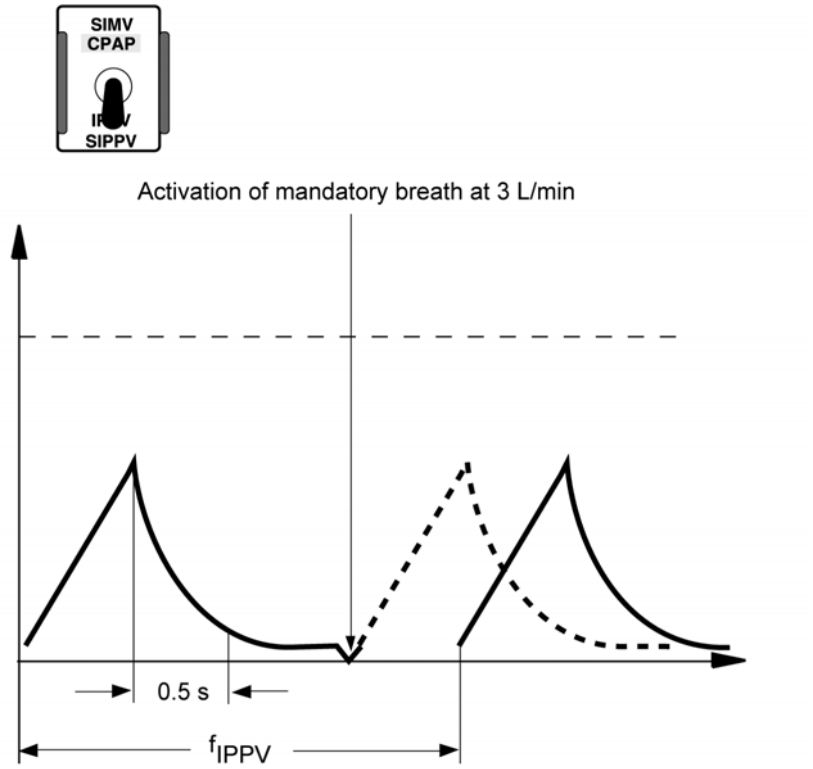

Figure 5 SIPPV

If the patient triggers within the expected trigger window, the frequency per minute is increased.

To access the SIPPV mode, first set the mode selector switch to SIPPV. Then use the info key on the display to go to SIPPV and select with the reset key.

If the measured frequency exceeds the set frequency by more than 50%, the following alarm message is displayed: Frequency high. The max. inspiratory time is always limited to 1.3 seconds.

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6.6 IPPV with PEEP (CPPV)

(**P**ositive **E**nd **E**xpiratory **P**ressure)

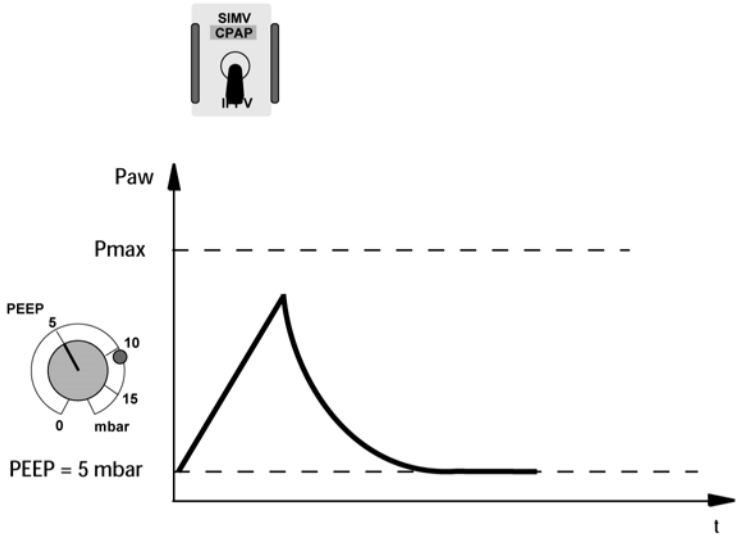

Figure 6 IPPV with PEEP

If applicable, Pmax must be readjusted.

Alarms as under IPPV.

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6.7 SIMV (**S**ynchronized **I**ntermittent **M**andatory **V**entilation)

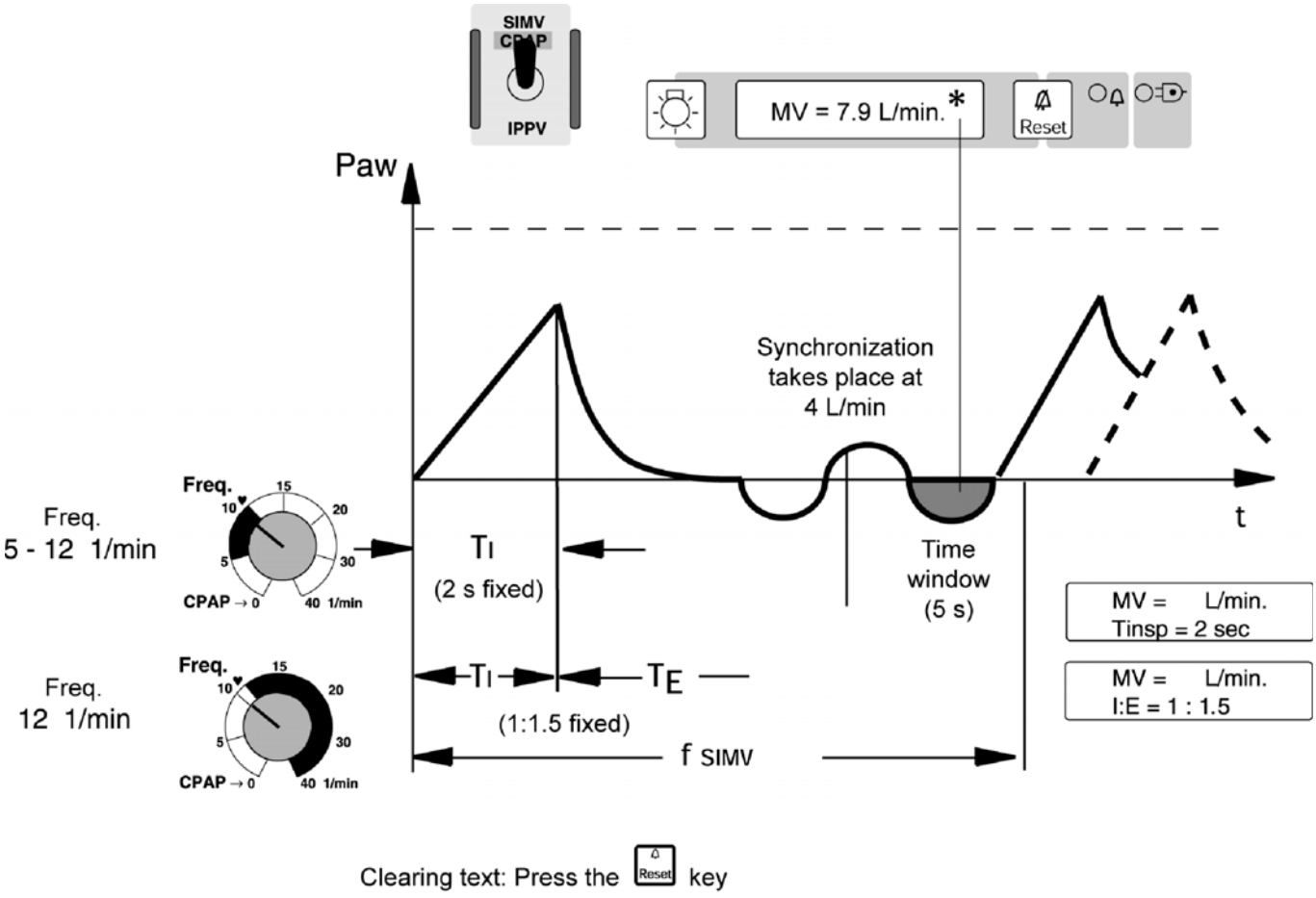

Figure 7 SIMV

PEEP and alarms as under IPPV.

The time window is activated via the SIMV switch position.

The following correlation applies as of SW 3.XX:

Frequency:	5 - 18.5 1/min	Tinsp:	1.3 seconds (fixed)
	as of 18.5 1/min	TI:TE:	1.5 seconds (fixed)

As of SW 3.XX the trigger window is 6 seconds.

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6.8 SIMV trigger window

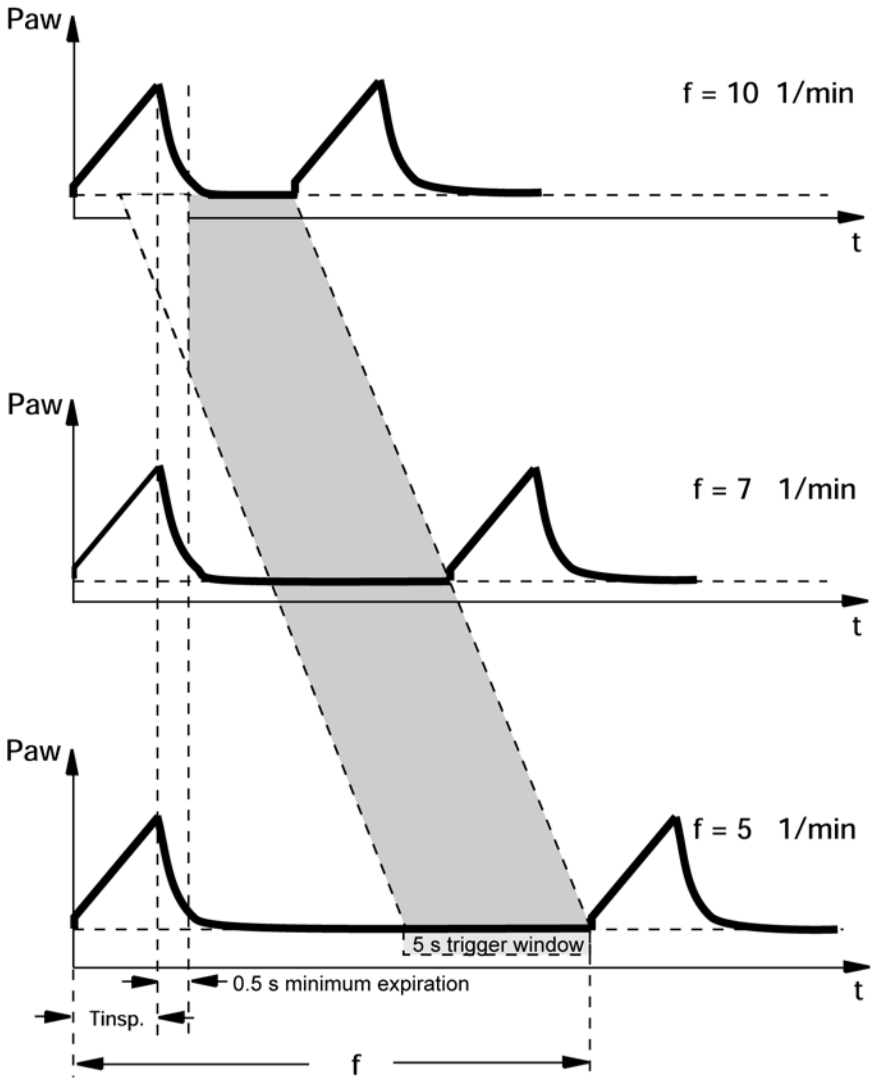

Figure 8 SIMV trigger window

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6.9 Fixed SIMV frequency

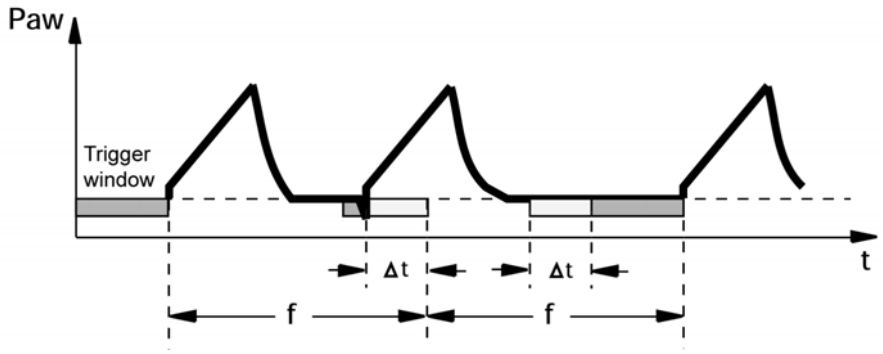

Figure 9 Fixed SIMV frequency

No increase in frequency in the event of patient triggering as the following mandatory breath is automatically adjusted to the set frequency.

6.10 CPAP

(**C**ontinuous **P**ositive **A**irway **P**ressure)

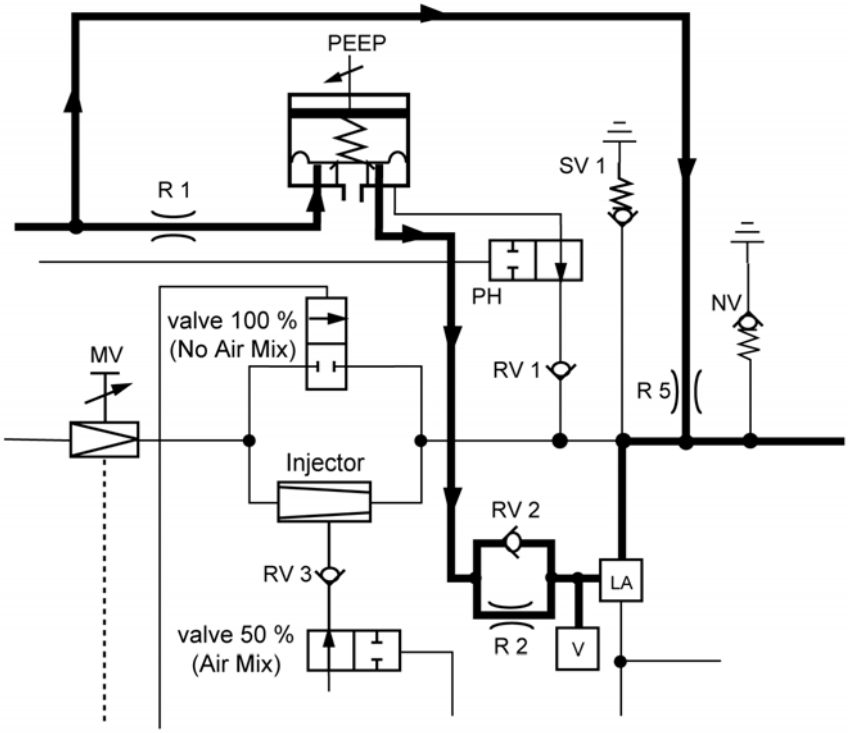

Figure 10 CPAP

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7 Functional diagram

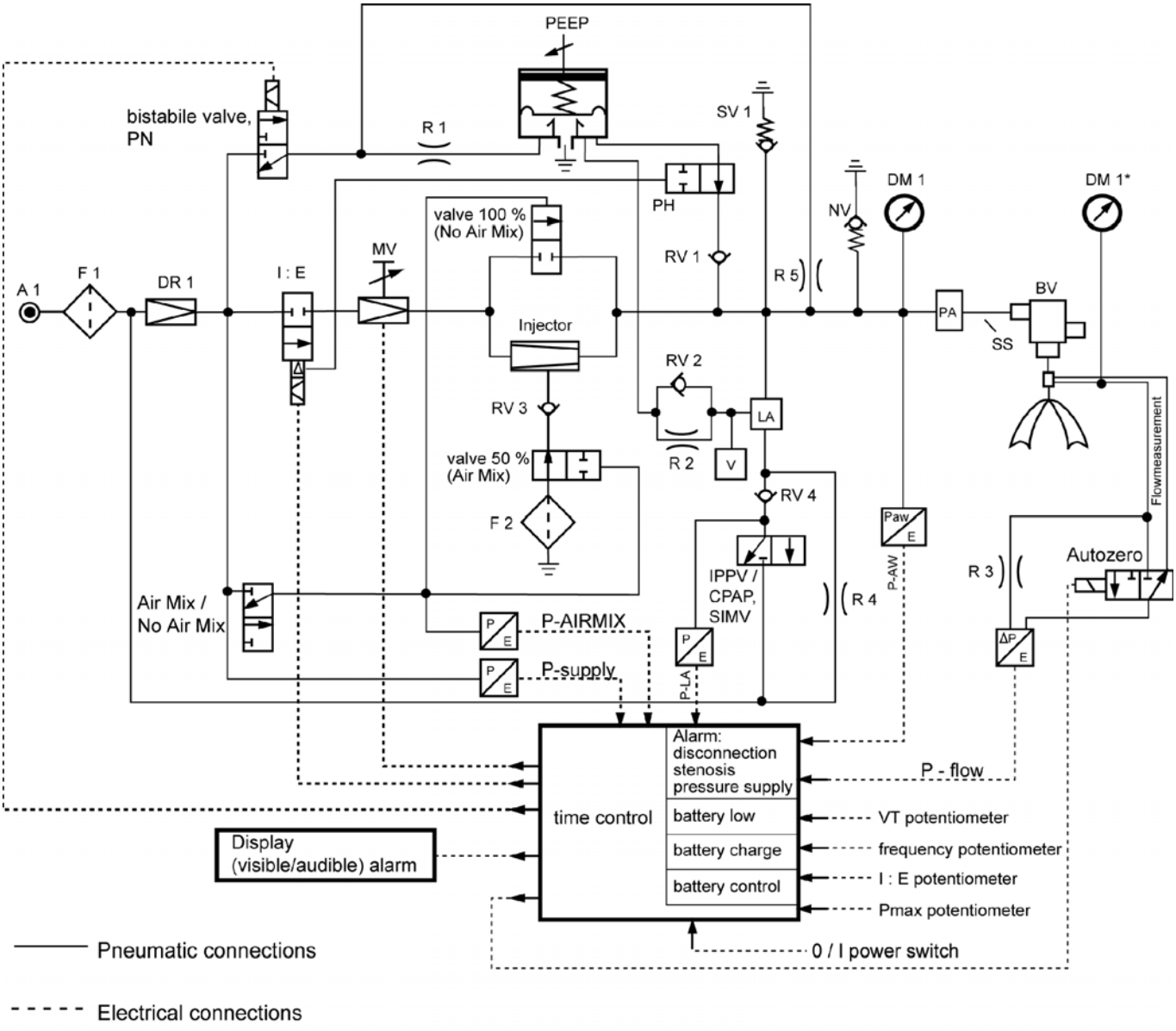

Figure 11 Functional diagram of the Oxylog 2000

Table 4 Legend to Figure 11

Item	Name
A1	Gas connection
F1	Filter element
DR1	Pressure regulator
Valve PN	Bistable PN valve (electrical)
I:E valve	Bistable I:E valve (electrical), monostable as of SW 2.00
MV	Minute volume (electrical/pneumatic)

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Item	Name
50% valve	2/2-way valve (pneumatic)
100% valve	2/2-way valve (pneumatic)
PH	2/2-way valve (pneumatic)
PEEP	PEEP valve (pneumatic)
AIR MIX/NO AIR MIX	3/2-way valve (pneumatic)
IPPV/CPAP SIMV	3/2-way valve (pneumatic)
Autozero	3/2-way valve (electrical)
SV 1	Safety valve
NV	Emergency air valve
DM 1, DM 1*	Pressure gauge, *as of SW 3.10, the pressure gauge is connected directly to the patient-side flow measuring line.
PA	Patient connection port
SS	Hose system
BV	Ventilation valve with flowmeter
LA	Demand valve
Filter	
Injector	
R1	Restrictor 0.5 L/min (2.5 bar)
R2	Restrictor 0.7 L/min (0.5 bar)
R3	Restrictor 1.1 L/min (0.5 bar)
R4	Restrictor element, Ø = 0.42 mm
R5	Restrictor 0.5 L/min (2.5 bar)
RV1	Non-return valve
RV2	Non-return valve
RV3	Non-return valve
RV4	Non-return valve
P/E P-AIR MIX	AIR MIX pressure sensor
P/E P-supply	Supply pressure sensor
P/E P-LA	Demand valve pressure sensor
Paw/E P-AW	Airway pressure sensor
ΔP/E P-Flow	Flow measurement pressure sensor
Time control	Control PCB
Potentiometer	Front panel
Display	
0/1 switch	
V	Volume 4.8 mL

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8 Function description

8.1 Gas connection, device switched off

Oxygen or compressed air (2.7–6.0 bar) travels through the connection A1 and the filter F1 to the pressure regulator DR1. The pressure regulator reduces the gas to a constant pressure of 2.5 bar (at a flow rate of 40 L/min). This pressure is available at the PN valve, I:E valve, Air Mix / No Air Mix selector and P/E converter P-supply.

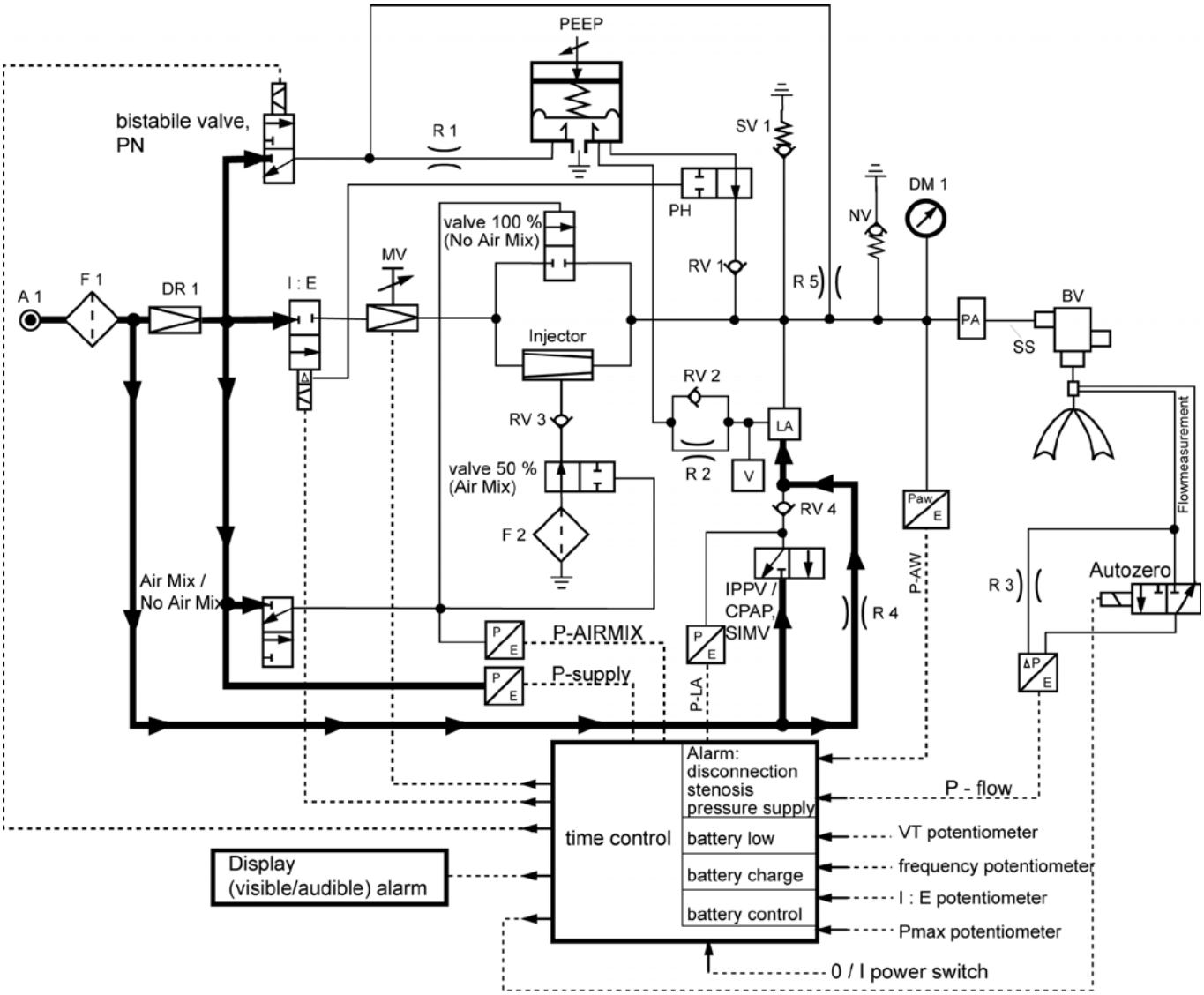

Figure 12 Device off

The pressure is measured off upstream of the pressure regulator; this gas (supply pressure) travels to the IPPV/SIMV, CPAP selector and through the restrictor R 4 to the demand valve LA.

Air-Mix (60 % mode)

In the Air-Mix position no control gas is supplied to the 50% and 100% valves, that is, the device is switched to injector operation.

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8.2 Power supply

Power supply to the device is ensured by an internal battery pack or a battery pack.

In either case the electrical power can also be supplied from an external voltage source via a connecting cable with DC/DC converter from the on-board supply of a vehicle or by using a power supply unit in stationary operation.

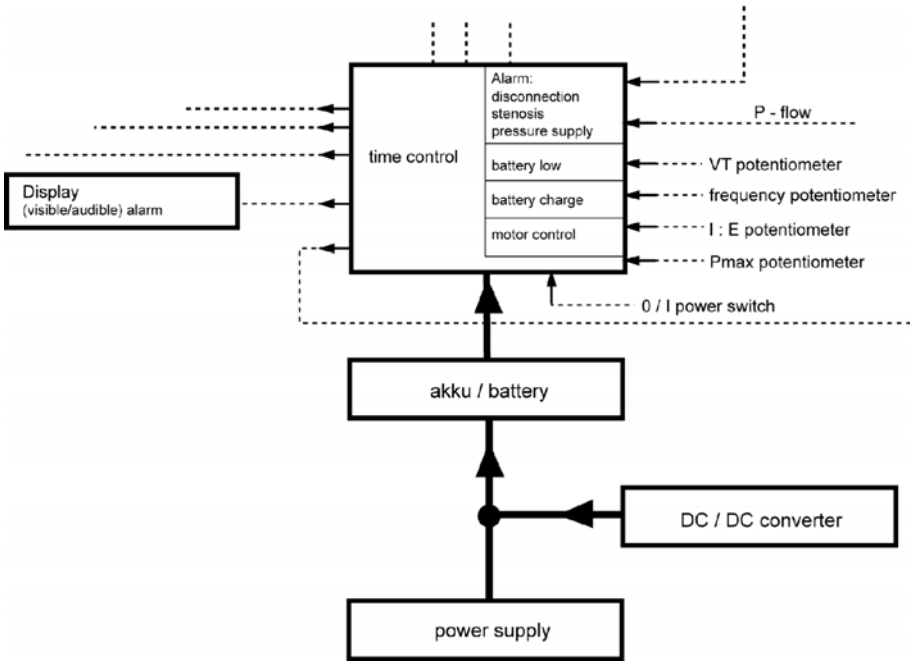

Figure 13 Power supply

The external supply is used to operate the device and to charge the battery.

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8.3 Electronic inputs

On the Control PCB the applied voltages, the potentiometer values (VT, frequency, I:E, and Pmax) as well as the pressure/flow values (P-supply, P-AIR MIX, P-LA, P-AW, ΔP-flow) are read in and monitored.

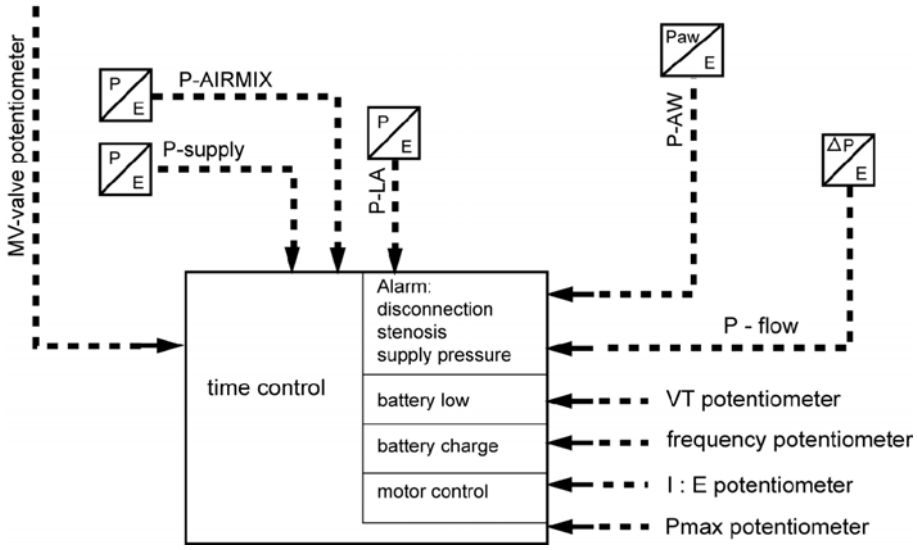

Figure 14 Electronic inputs

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8.4 Electronic outputs

The PN valves, the I:E valve, the MV flow valve and the autozero valve are controlled according to their relevant settings. Likewise the LC display and the buzzer are controlled, and the minute volume and the relevant messages and alarms are displayed.

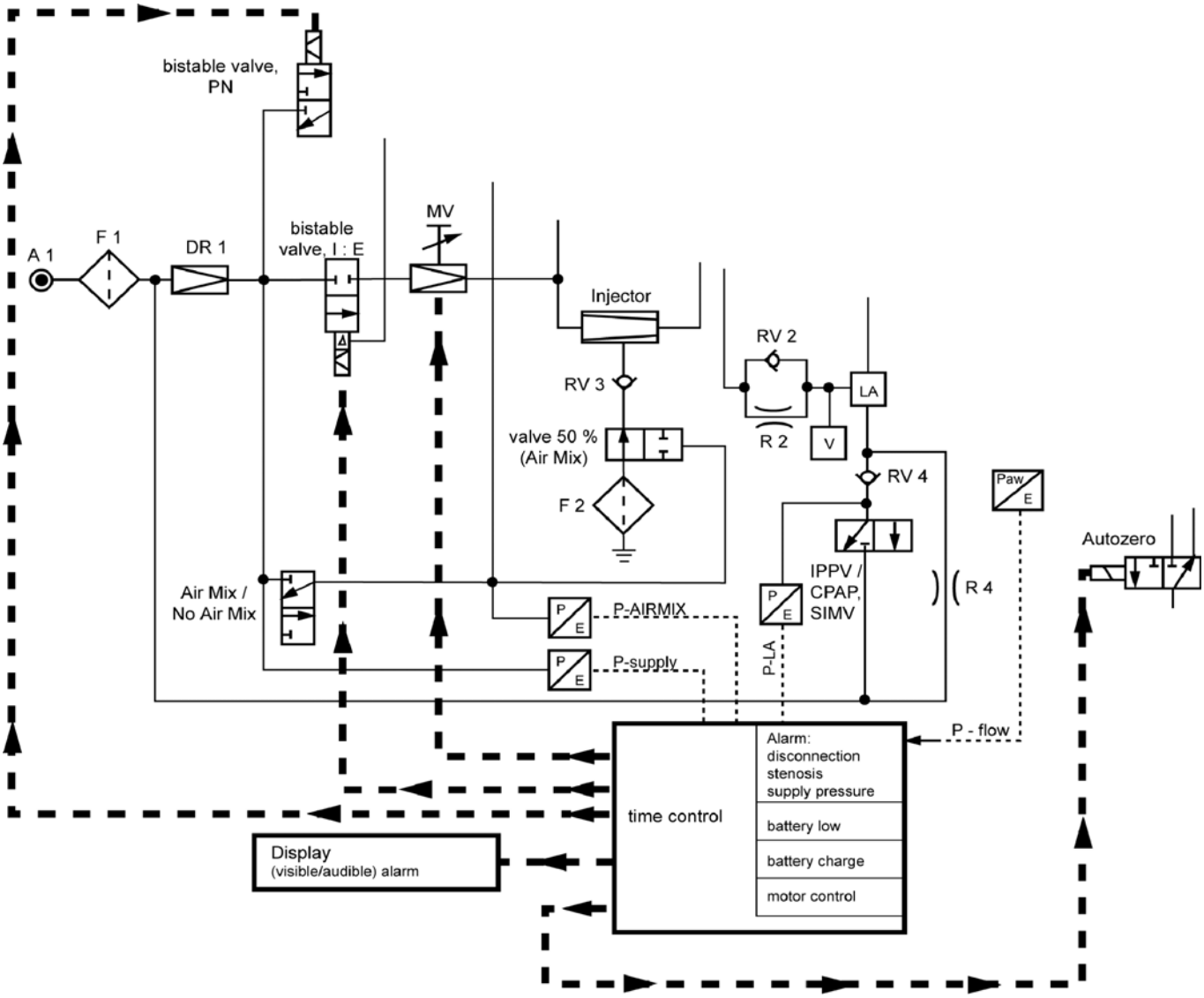

Figure 15 Electronic outputs

8.5 Switching the device on, IPPV, inspiratory Air Mix (50%)

As soon as the device is switched on, the bistable PN valve is controlled (opened) electrically and remains in this position until the device is switched off. Gas is delivered to the PEEP control system via the PN valve and the fixed restrictor R 1 (0.5 L/min) and is used accordingly during expiration.

Gas also flows into the inspiratory branch through the fixed restrictor R 5 (0.5 L/min). This constant flow is supposed to compensate for minor leakages which otherwise would lead to fluctuations in the PEEP pressure.

The bistable I:E valve is also controlled and opened electrically. The applied gas flows to the PH switching valve and interrupts the connection to the PEEP valve. At the same time, it travels to the minute valve which adjusts

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according to the preselected values (MV, I:E, f). From there, it flows to the injector which draws in additional ambient air through the non-return valve RV 3, the 50% valve the and the filter. This gas then flows to the patient via the patient hose SS and the ventilation valve BV. The inspiratory ventilation pressure is indicated on the pressure gauge DM1 and monitored by the Paw pressure sensor. The Paw pressure sensor is used to generated the disconnect and stenosis alarms. The supply pressure is monitored via the P-supply pressure sensor.

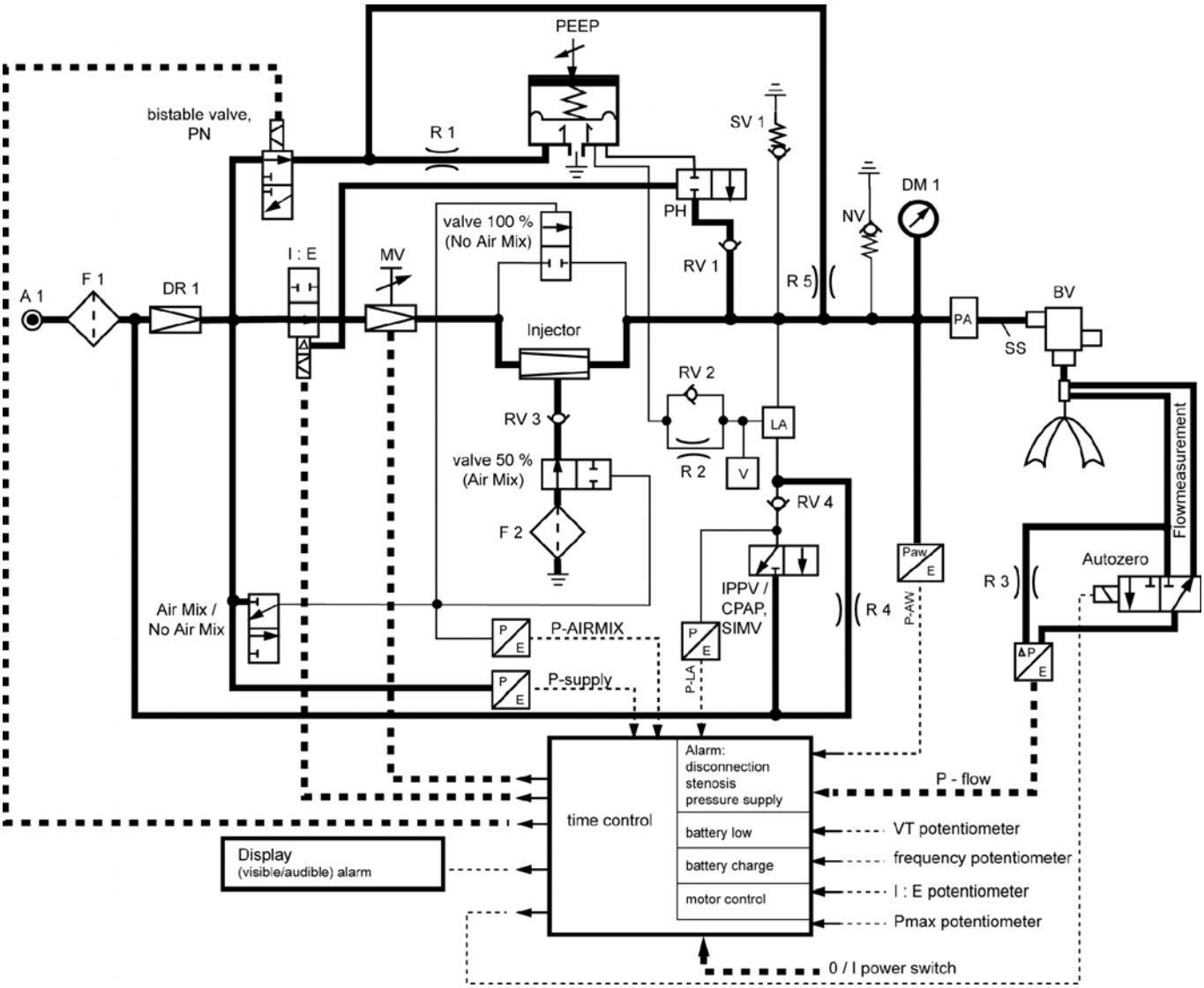

Figure 16 IPPV inspiration

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8.6 Bistable valves

The bistable valves I:E and PN receive a current impulse of approx. 50 ms only during the power-on or power-off phase. This impulse is sufficient to switch the valve from one stable end position to another. Therefore, the valve needs current only during the switching process.

As of SW 2.00 the I:E valve is a monostable valve instead of a bistable valve.

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8.7 IPPV, Expiration

The I:E valve is switched off after the inspiratory time (TI:TE), expiration starts. The switching valve PH is switched over, the gas present in the ventilation hose is vented to atmosphere via the switching valve PH and the PEEP valve (PEEP=0). The patient can then exhale to atmosphere via the flow valve and the ventilation valve (BV). The expiratory flow is measured via the sensor (P-Flow) and indicated on the display.

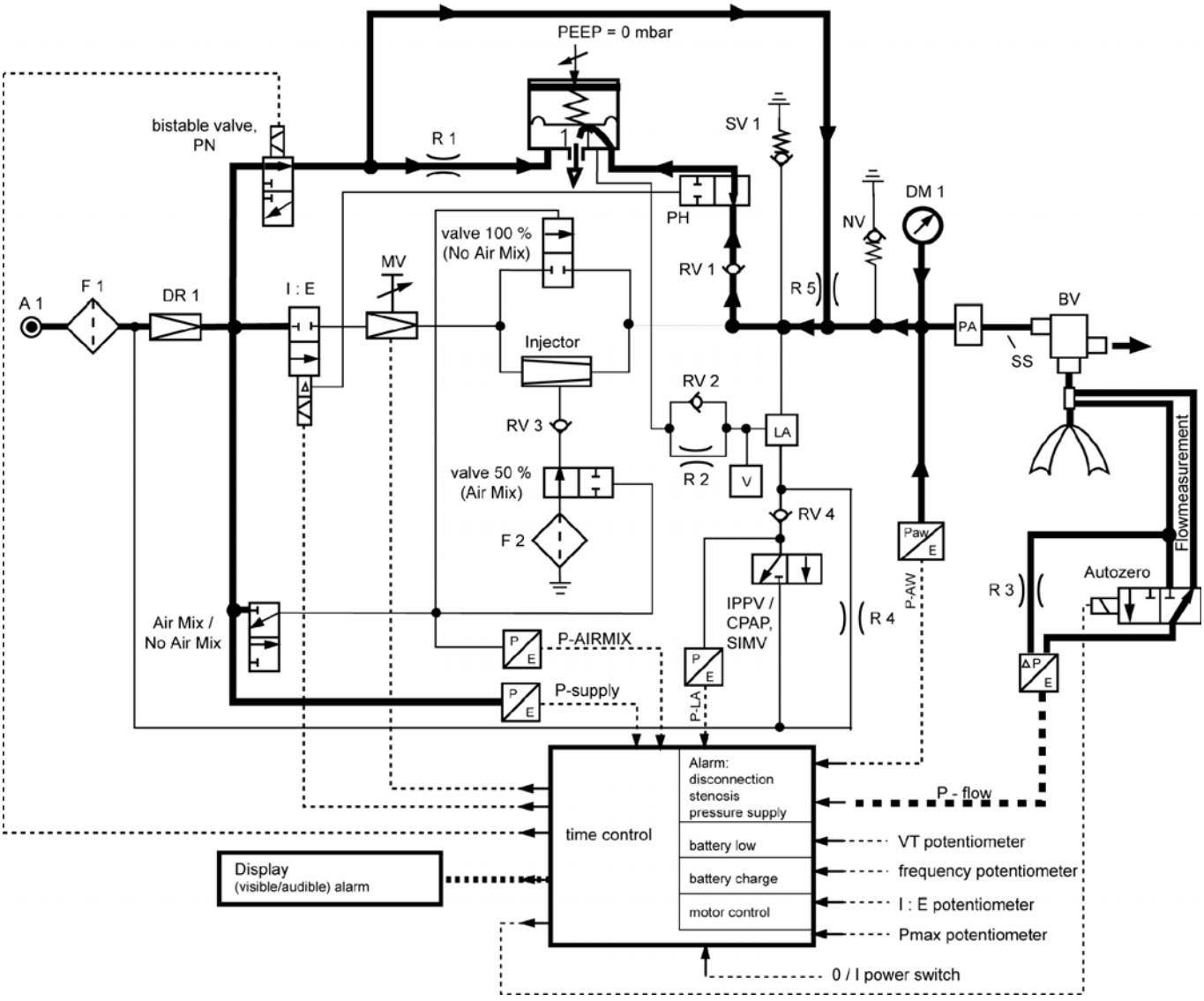

Figure 17 IPPV, Expiration

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8.8 IPPV, expiration with PEEP >0 mbar (CPPV)

At a PEEP setting ≥0 mbar the diaphragm in the PEEP valve is mechanically pre-loaded by a spring. Thus, during expiration the inspiratory pressure present can be vented to atmosphere only up to the set value. For stabilization of the set PEEP value and for attenuation of the system a defined flow of 0.5 L/min is fed into the PEEP control system via R 1. Given the surface ratio of 1:1, the pressure on the patient side equals more or less the pressure on the device side. Thus, the PEEP pressure can be measured using the integrated pressure gauge DM 1 without the need of an additional pressure measuring line. The patient can exhale only up to the set pressure, that is, a residual pressure remains in the lung (PEEP).

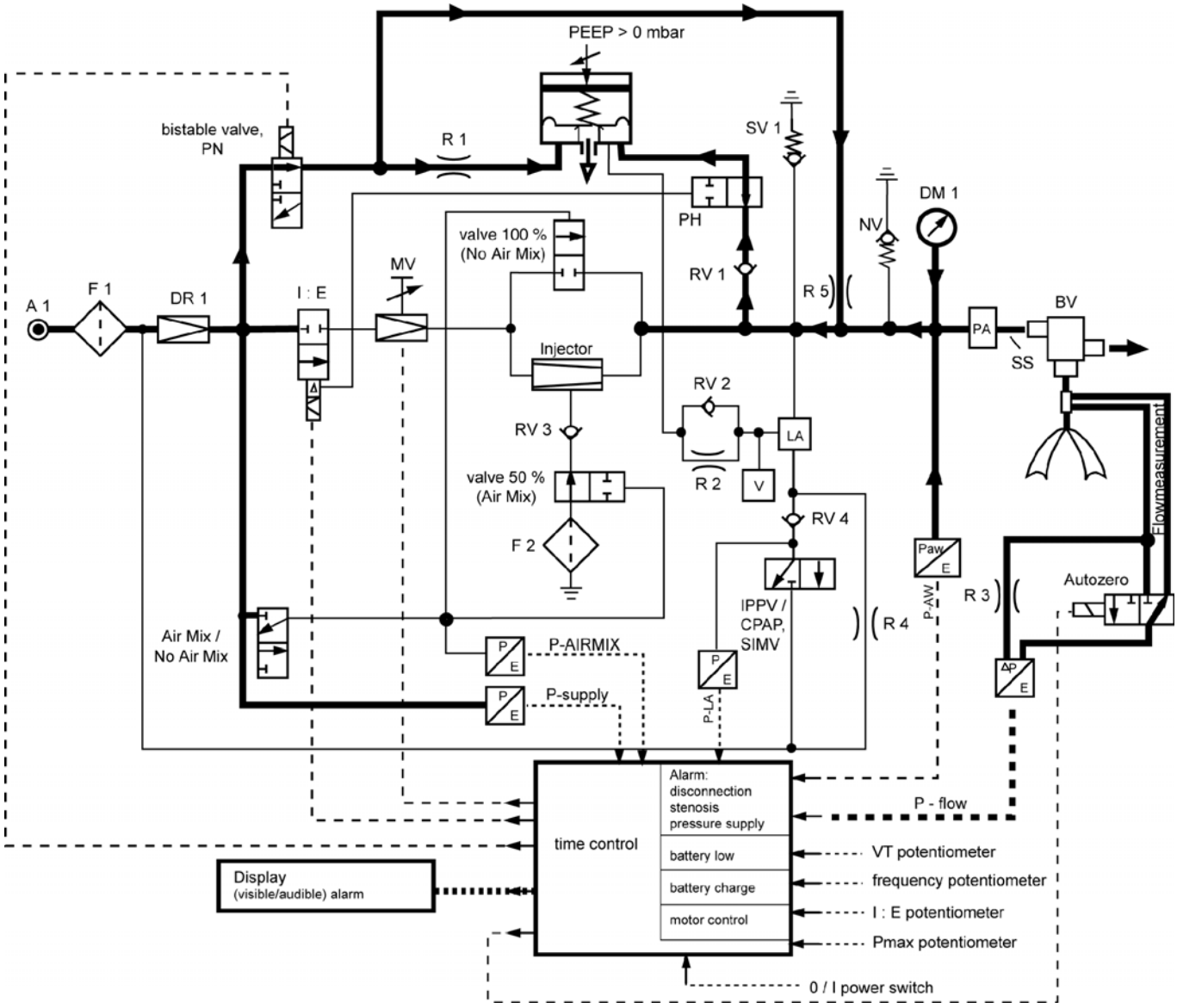

Figure 18 IPPV with PEEP (CPPV)

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8.9 IPPV, inspiration, No Air Mix (100%)

The No Air Mix (100% operating gas) is changed via a mechanical 3/2-way valve. The gas present flows to the 50% and 100% valves which are reversed. This prevents the injector from drawing in more gas. The gas is then delivered to the patient via the 100% valve. The pressure sensor P-AIR MIX sends a signal to the control reporting this switching status. The control makes sure the minute volume valve MV is adjusted accordingly so that the patient gets the same volume as with the Air Mix position.

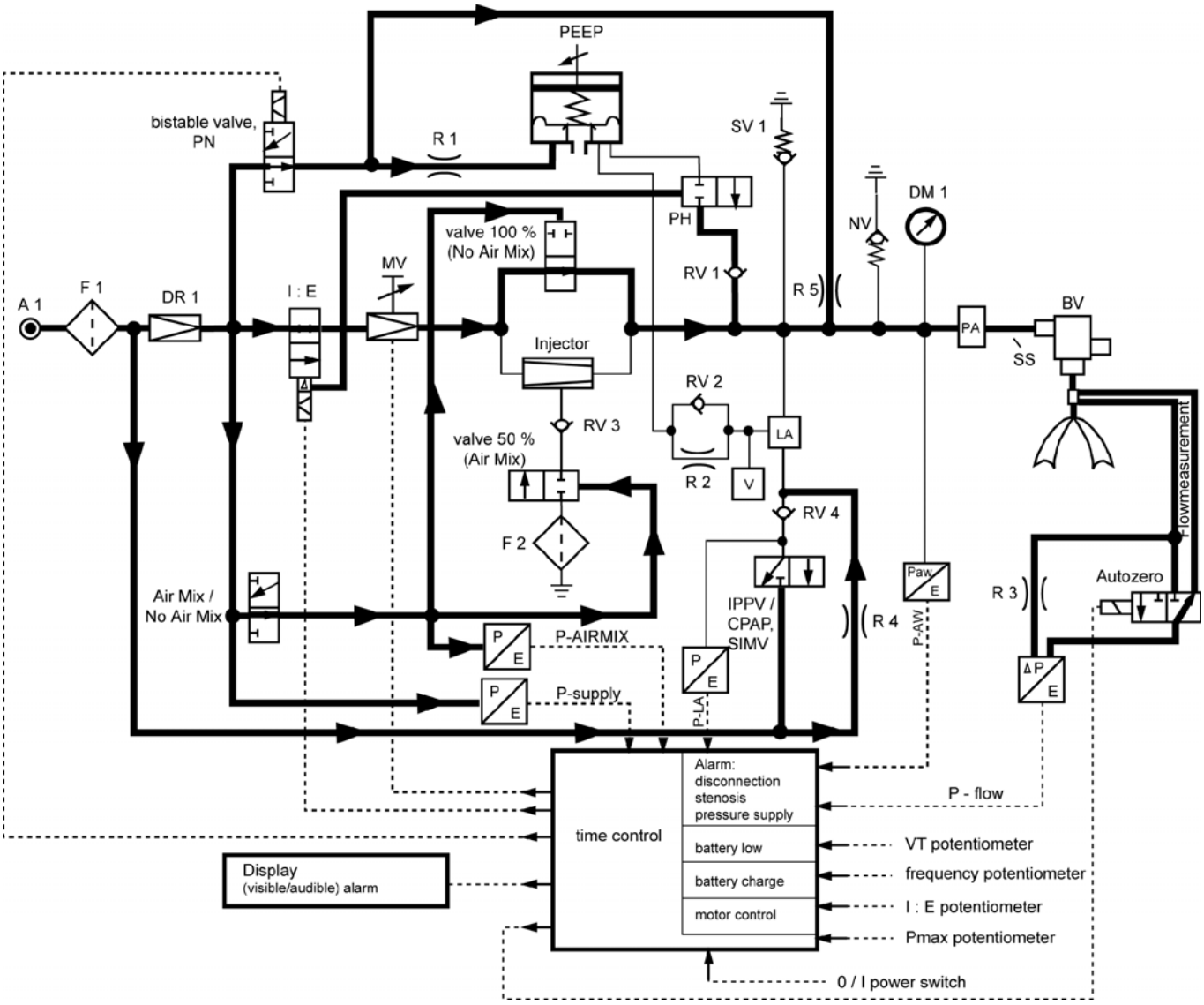

Figure 19 IPPV, inspiration (No Air Mix)

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8.10 SIPPV (synchronized IPPV) version

SIPPV is available as of SW 3.XX. SIPPV is a controlled ventilation mode where the patient triggers the mandatory breath. The mode selector switch is set to IPPV/SIPPV. The SIPPV mode is activated via the menu. The mandatory breath is triggered via the flow sensor if the patient draws a flow of at least 3 L/min from the system.

8.11 Spontaneous breathing (PEEP = 0)

The demand valve (LA) is continuously supplied with gas (pre-controlled) via the restrictor R 4. This is to avoid a pressure surge (Paw) when switching over from IPPV to CPAP/SIMV. To set the CPAP mode, the mechanical 3/2-way valve must be set to CPAP/SIMV. In addition, the frequency must be set to 0 1/min. The demand valve (LA) is supplied with gas via the 3/2-way valve CPAP/SIMV and the non-return valve RV 4. This gas is also present at the pressure switch (P-LA) which transmits this switch position to the control as electrical signal. The delivery behavior at the first breath of the demand valve is attenuated ("LA pre-loaded") via the restrictor R 4. The demand valve opens when the patient tries to inhale (≥1 mbar). Gas is delivered until the set CPAP value is reached.

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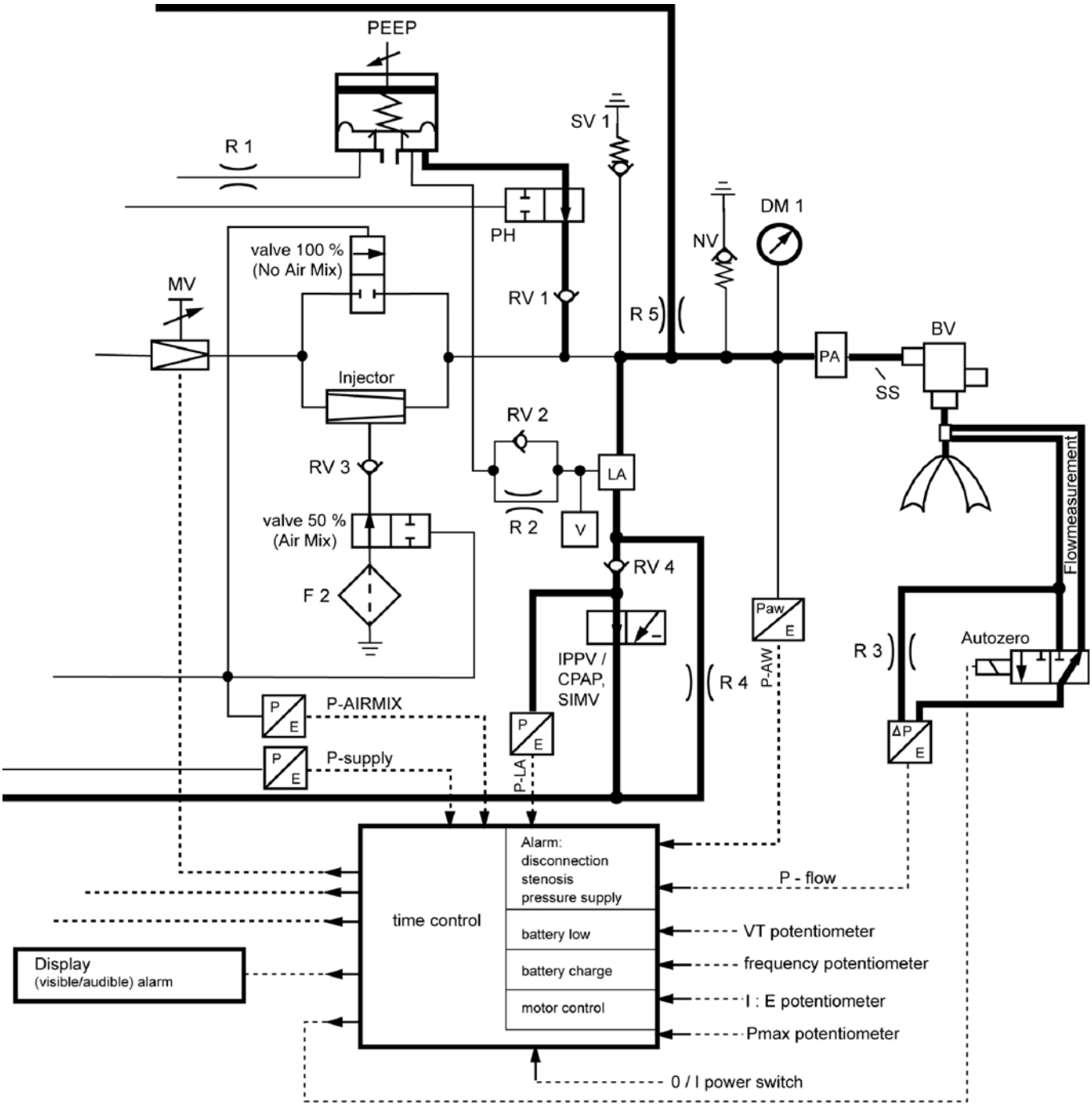

Figure 20 Spontaneous breathing

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8.12 CPAP (PEEP >0 mbar)

The PEEP valve is set as described under IPPV-PEEP.

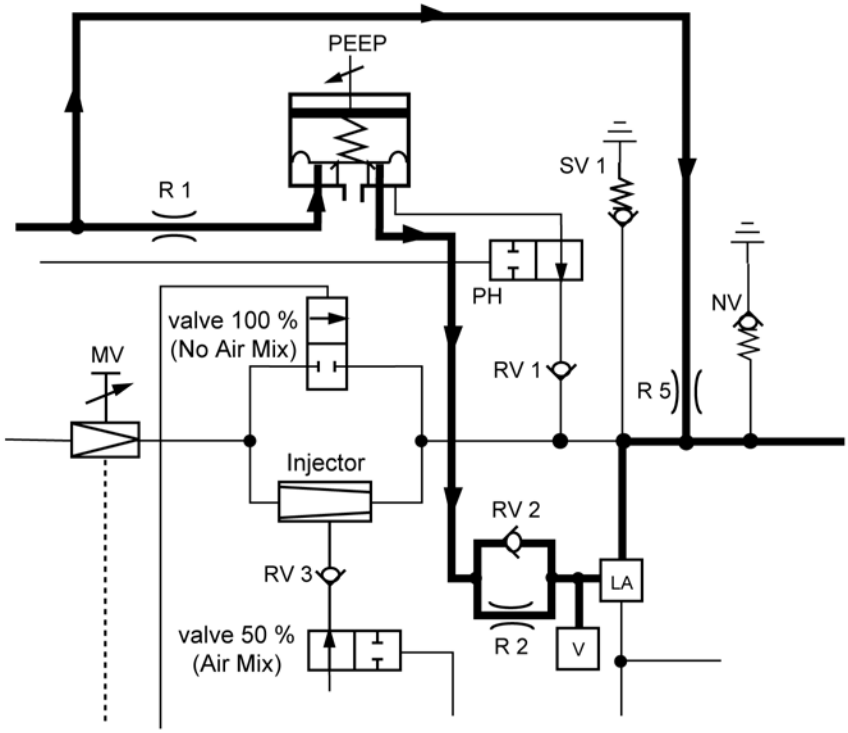

Figure 21 CPAP

A positive pressure above the control diaphragm of the demand valve (up to the patient) is generated via the R/C element RV 2 and R 2. The non-return valve RV 2 allows a fast generation of the pressure, the restrictor R2 provides the attenuation.

The non-return valve RV1 makes sure the CPAP control pressure is applied to the control input of the demand valve via the R/C element RV2 and R2 and does not escape through the PH valve in the hose system.

The respiratory gas delivered to the patient is always 100% of the operating gas (O2 or Air). Air Mix/No Air Mix switch is irrelevant.

8.13 SIMV

SIMV is a combination of IPPV and CPAP.

Depending on the switch position, the volume of the mandatory breaths has approx. 60% O2 in AIR MIX mode or 100% O2 in NO AIR MIX 100% O2. The spontaneously breathed volume has always 100% operating gas (21% O2 in AIR or 100% O2 in O2 mode). In this case, the mechanical 3/2-way valve is set to SIMV/CPAP and the frequency is ≥5 min^{-1}. The procedure is the same as described under IPPV and CPAP. The difference is the time window before the beginning of the mandatory breath. This time window is fixed to approx. 5 s and is activated by the pressure present at the P-LA pressure sensor. Triggering of the breath (synchronization) in the time window is done via the flow sensor. Without flow sensor there is no synchronization of the mandatory breaths. The frequency is maintained at a constant level.

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8.14 Pmax

The level of the ventilation pressure is limited via the Pmax setting (20–60 mbar). When this limit is reached, the unit switches immediately to expiration. No more gas is delivered to the patient. The unit can no longer apply a constant volume causing the minute volume to decrease. As of SW 3.XX, Pmax can be set to 80 mbar. At this setting, airway pressure between 60 and 80 mbar are limited by the safety valve. A single tone is issued as a warning signal. When the airway pressure exceeds 80 mbar, the unit switches to expiration.

8.15 Safety valve

If the Pmax value is exceeded considerably or if the Pmax control fails, the ventilation pressure is additionally reduced via an independent mechanical safety valve (SV 1). The safety valve is set to a fixed operating pressure of 60-80 mbar.

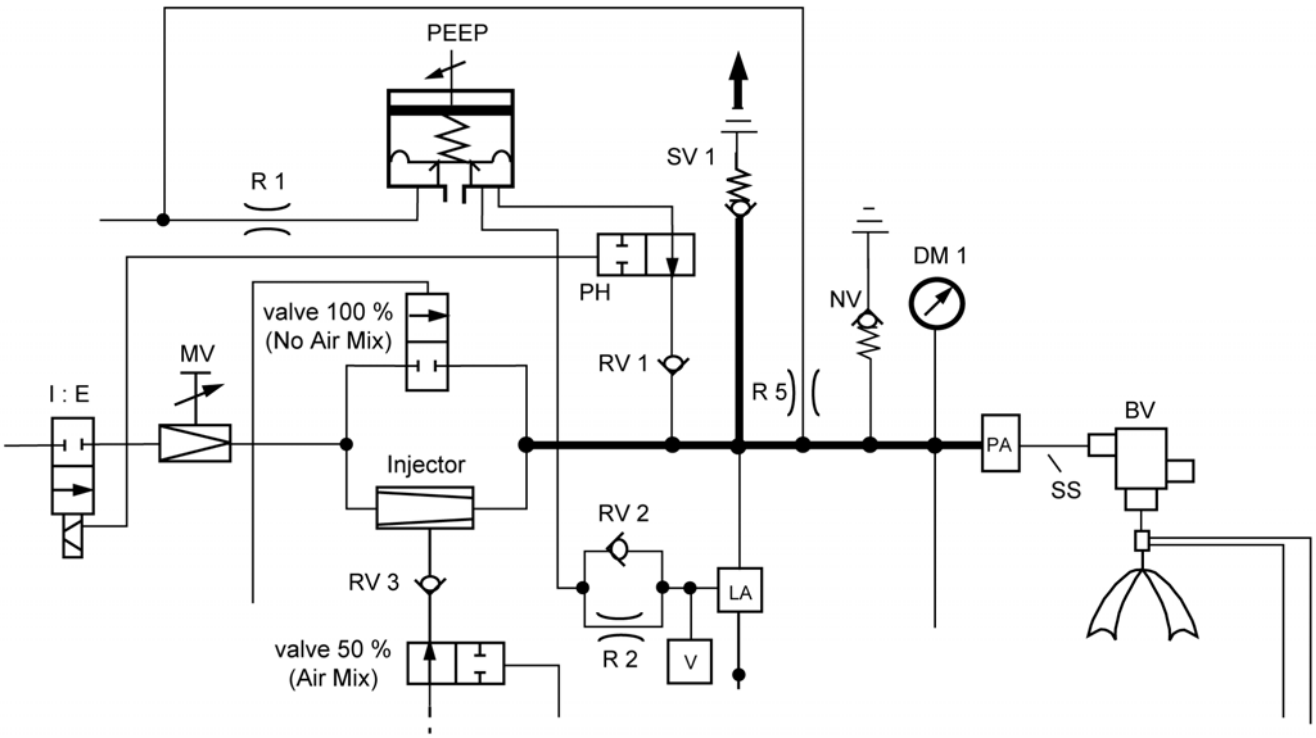

Figure 22 Safety valve

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8.16 Auxiliary air valve

An emergency air valve (NV) allows the patient to spontaneously breathe ambient air in the event of a gas supply failure or a device failure. The opening pressure of the emergency air valve is greater than/equal to -11.5 mbar.

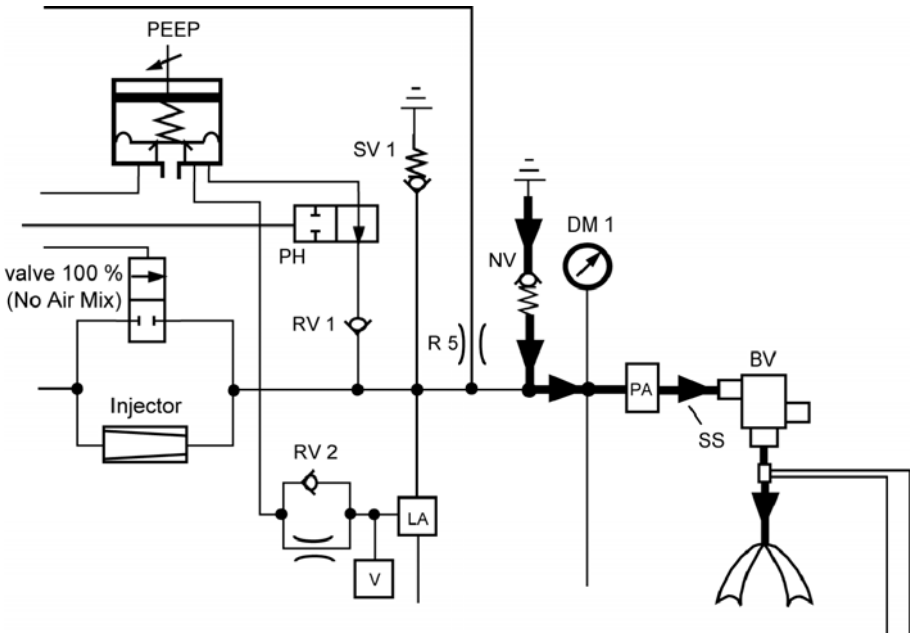

Figure 23 Auxiliary air valve

8.17 Flow measurement, autozero

The flow measurement principle is based on the differential pressure measurement.

ΔP results from the differential pressure (back-pressure from measuring lines 1 and 2).

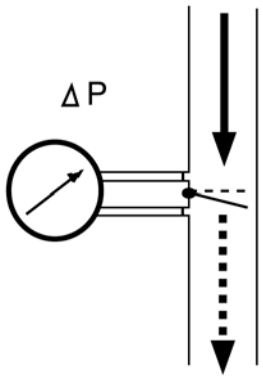

Figure 24 Flow measurement principle

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These pressures are measured by the pressure sensor P-flow and processed accordingly in the control system. The fixed restrictor R 3 is used to compensate for the resistance of the autozero valve. Same resistance in both hoses.

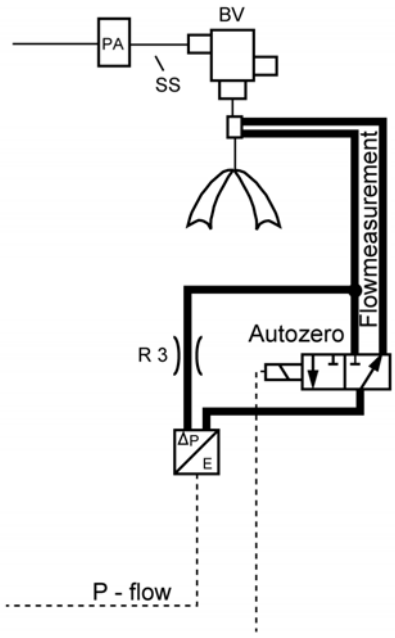

Figure 25 Flow measurement

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To compensate for pressure sensor drifts, the pressure sensor is short-circuited every 3 minutes via the autozero valve and is thus calibrated.

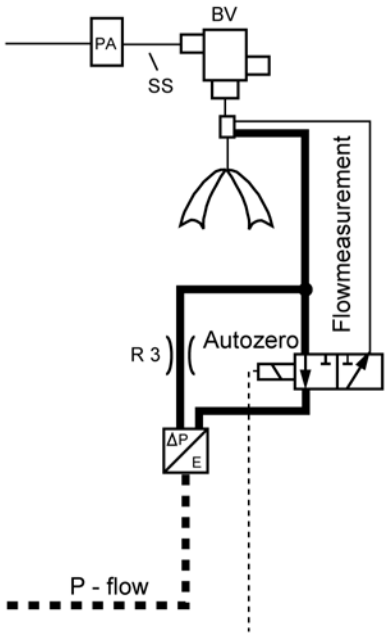

Figure 26 Autozero

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9 Device holder

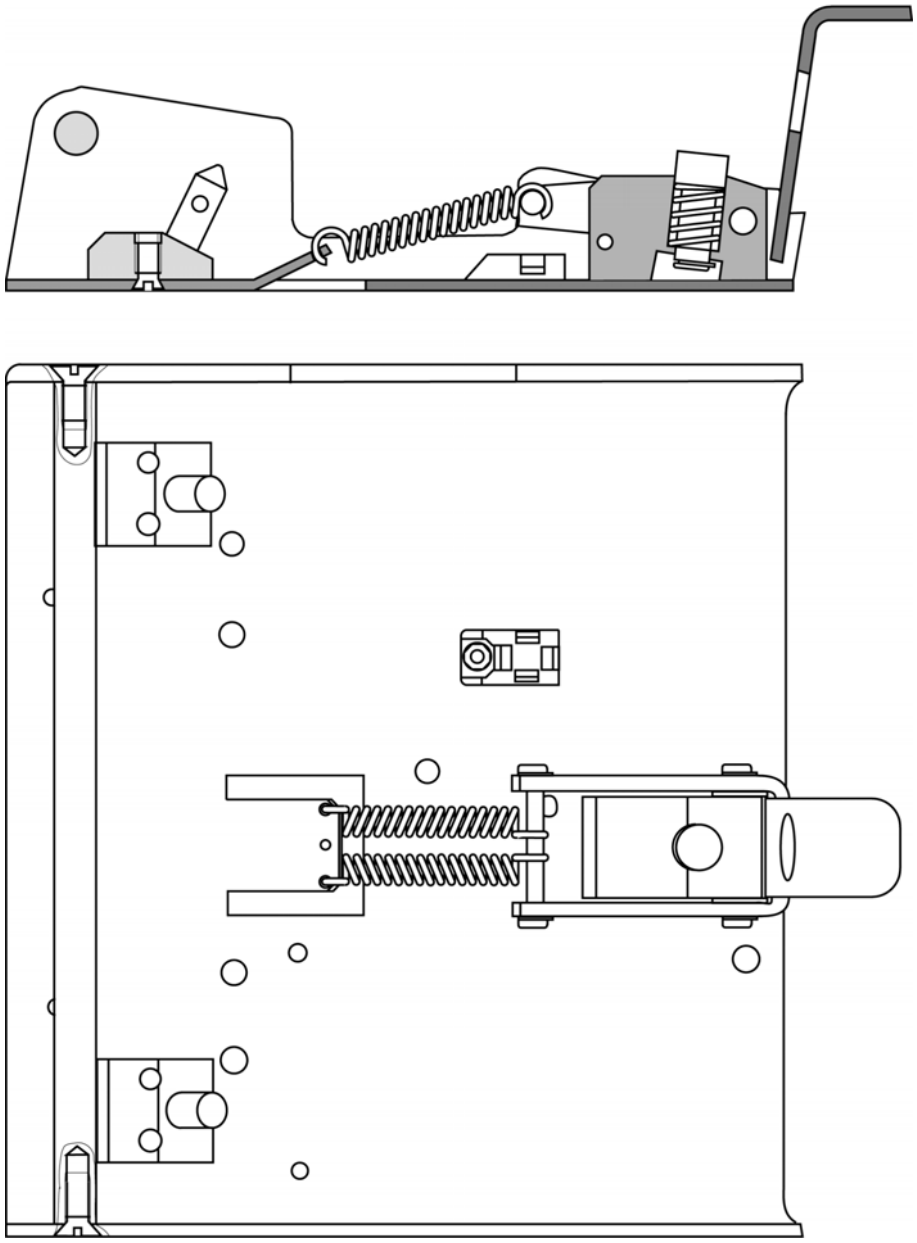

Figure 27 Device holder

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10 Front panels

10.1 Oxylog 2000 front panel (SW 1.XX)

Standard version

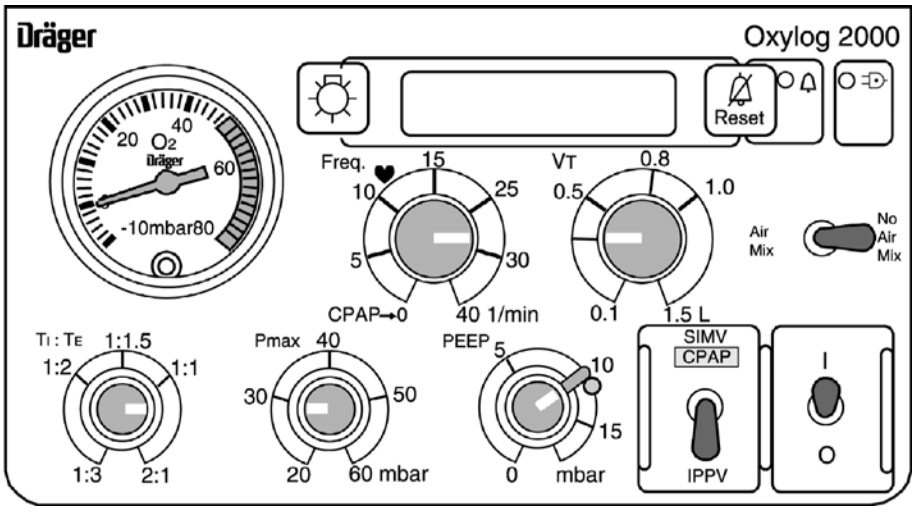

Figure 28 Oxylog 2000 front panel

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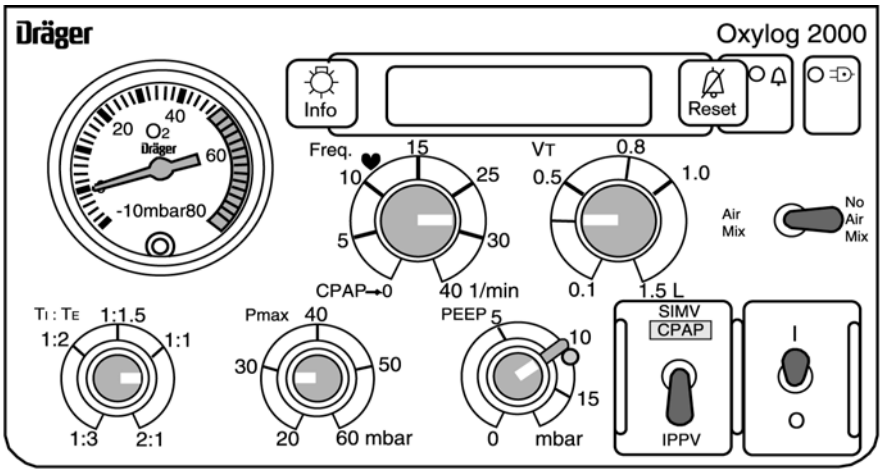
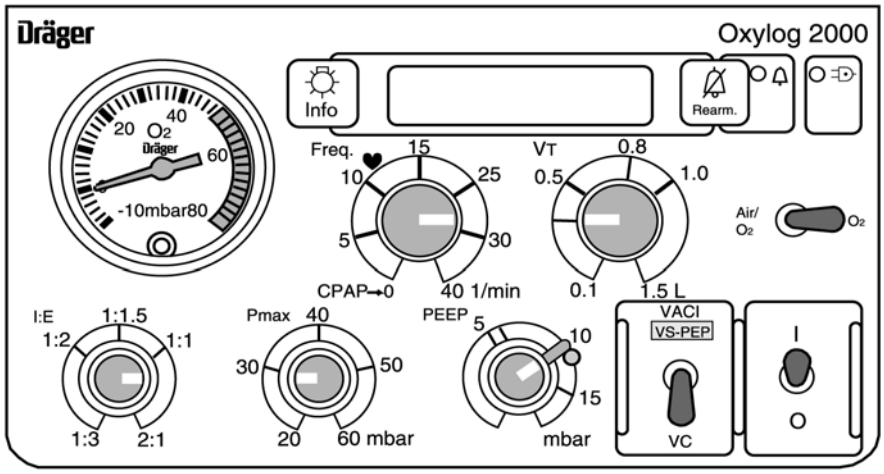
10.2 Oxylog 2000 front panels (SW 2.XX)

Standard version



French version



American version

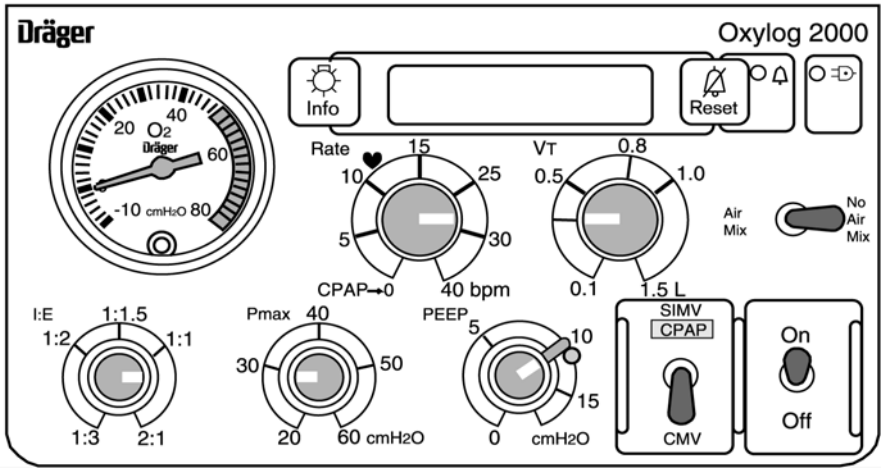


Figure 29 Oxylog 2000 front panels

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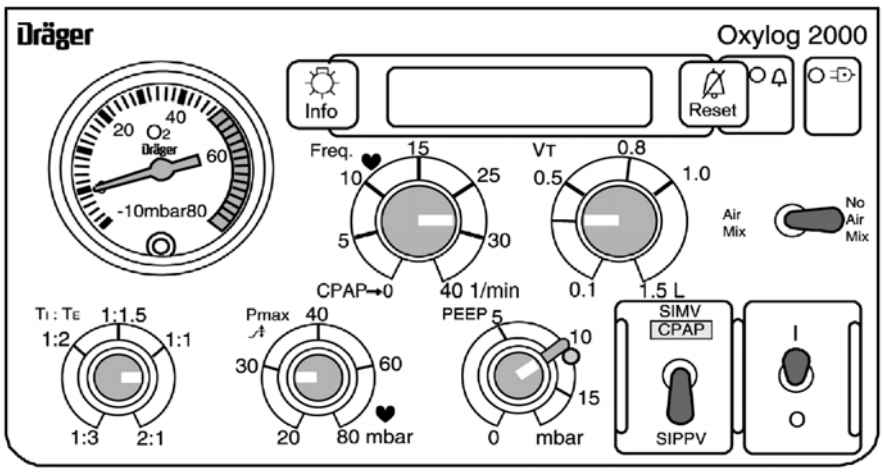
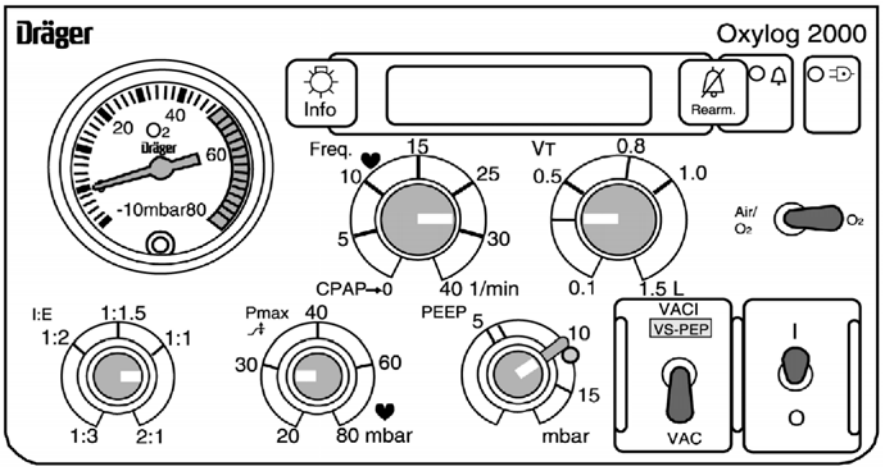
10.3 Oxylog 2000 front panels (SW 3.XX)

Standard version



French version



American version

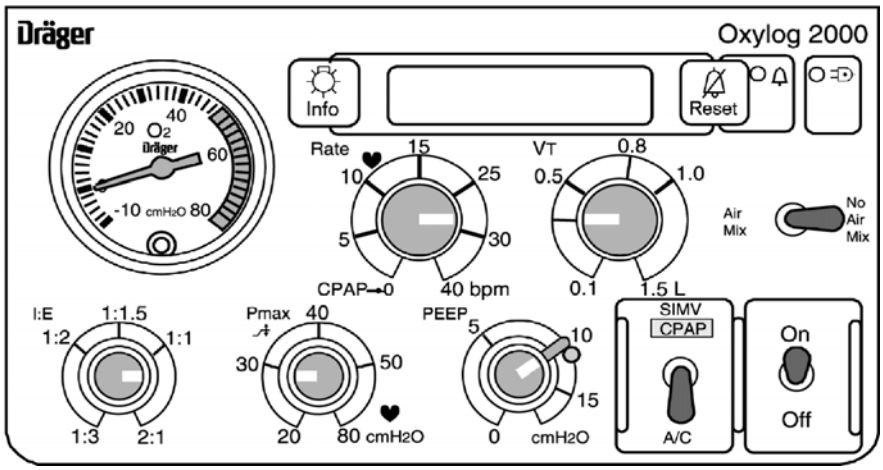


Figure 30 Oxylog 2000 front panels

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11 Pneumatic components layout

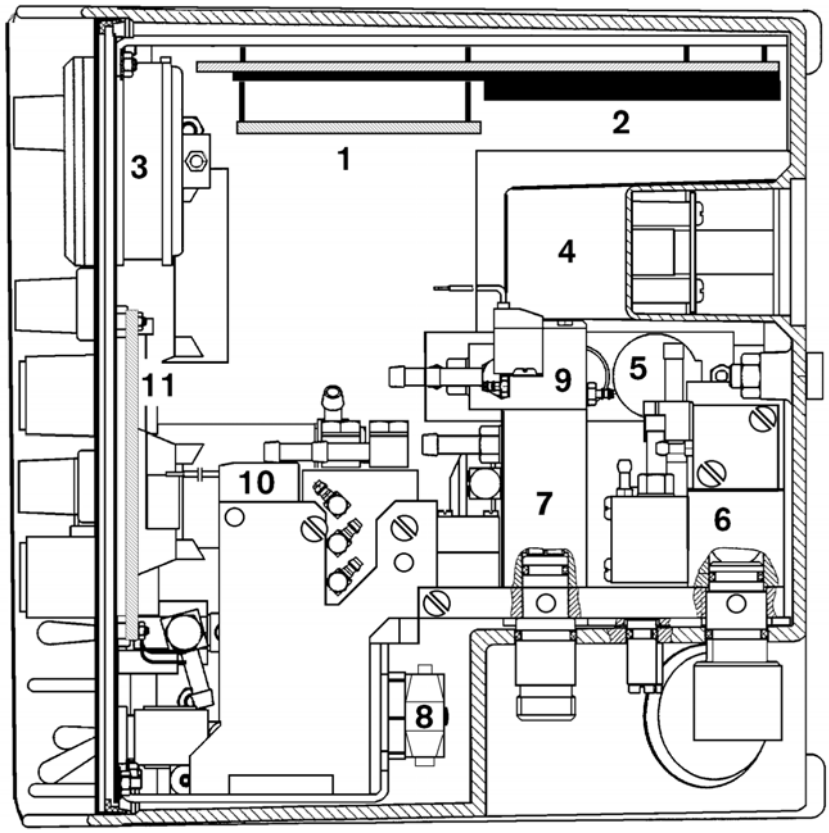

Figure 31 Pneumatic components layout

Table 5 Legend to Figure 31

Item	Name	Item	Name
1	Sensor PCB	**7**	Pipeline supply inlet
2	Control PCB	**8**	Pressure regulator
3	Pressure gauge	**9**	Autozero valve
4	Rechargeable battery pack/batteries	**10**	I:E valve, PN valve
5	MV valve	**11**	Display PCB
6	Pneumatic valve		

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12 Demand valve

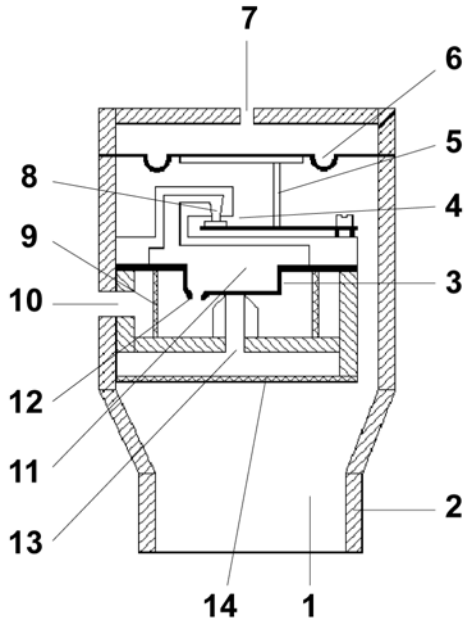

Figure 32 Demand valve

Table 6 Legend to Figure 32

Item	Name	Item	Name
1	Patient connection port	**8**	Nozzle
2	Housing	**9**	Sintered filter
3	Control diaphragm	**10**	Supply pressure connection
4	Locking bolt	**11**	Chamber
5	Connection lever	**12**	Inlet nozzle
6	Diaphragm (control diaphragm)	**13**	Crater
7	Connection to the PEEP valve	**14**	Sintered filter

12.1 Demand valve functional description

The connection (**10**) is directly connected to the supply pressure source via the IPPV/CPAP switch. The set PEEP pressure is applied to the connection (**7**) or the control diaphragm (**6**) of the demand valve via the R/C element (RV2 and R2, V). The outlet (**1**) is connected to the patient (**PA**) via the pneumatic assembly.

The patient's breathing effort creates a negative pressure at the patient connection (**1**). A pressure in the range of 0-15 mbar (PEEP) is present at the connection (**7**).

The patient's breathing effort moves the diaphragm (**6**) downwards. The connection lever (**5**) moves the closing bolt (**4**) downwards thus opening the nozzle (**8**) This causes the pressure in the chamber (**11**) to decrease. The control diaphragm (**3**) moves upwards; gas flows to the patient via the crater (**13**) and through the sintered filter (**14**).

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As soon as the patient's breathing effort stops, the diaphragm (**6**) moves upwards. The closing bolt (**4**) closes the nozzle (**8**) via the connection lever (**5**). The pressure in the chamber (**11**) increases, and the control diaphragm (**3**) closes the crater. The gas supply to the patient is interrupted.

13 Pneumatic assembly

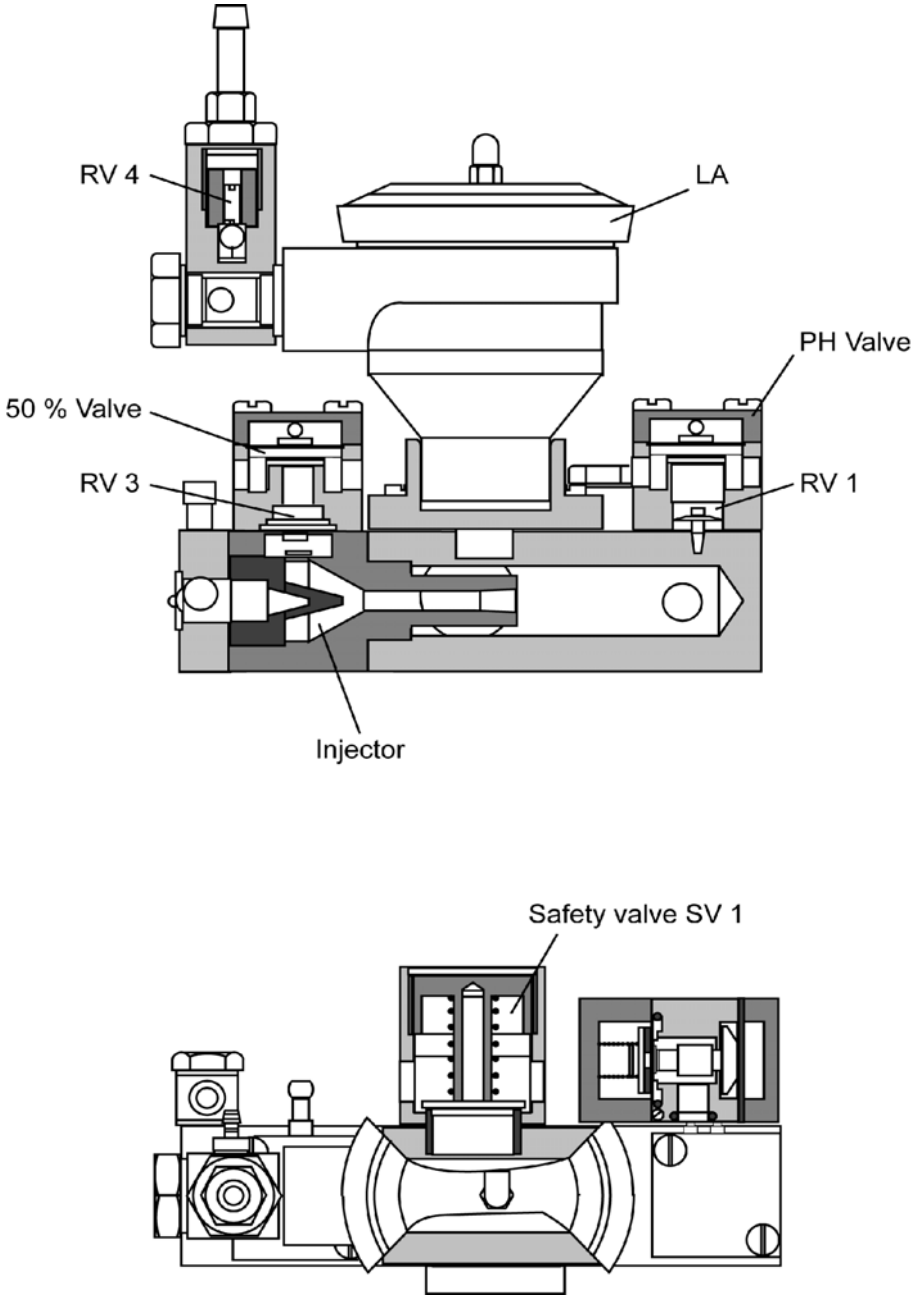

Figure 33 Pneumatic assembly

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14 PEEP valve

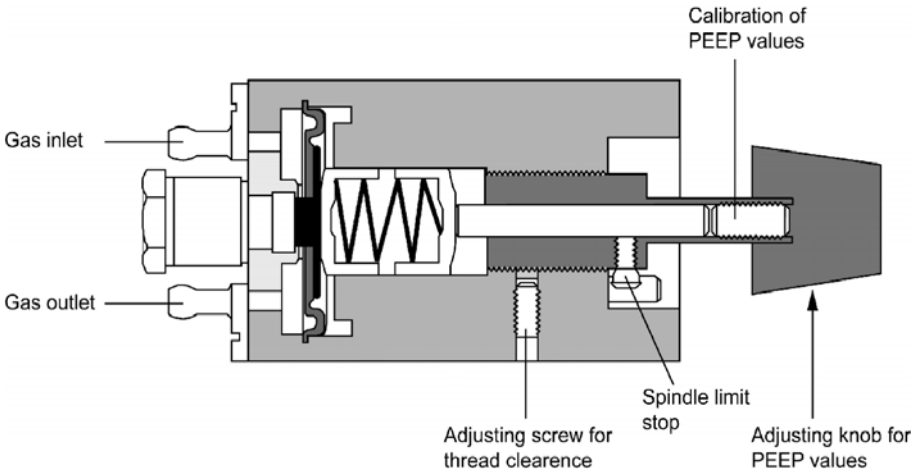

Figure 34 Design of the PEEP valve

15 Ventilation valve

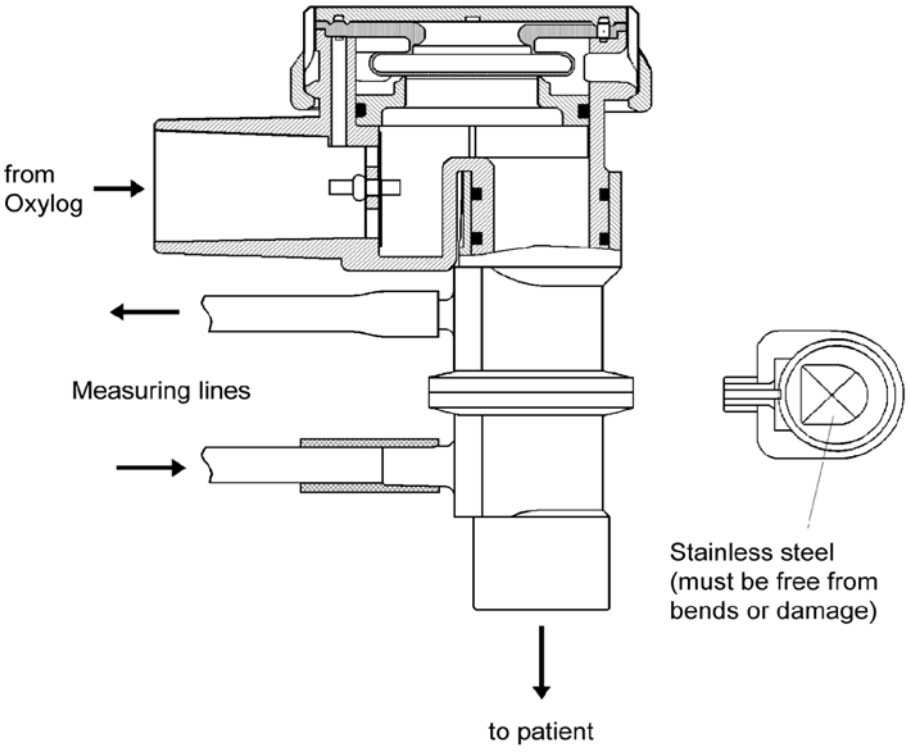

Figure 35 Design of the ventilation valve

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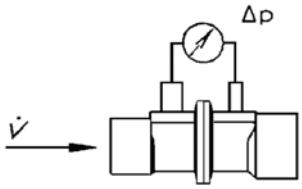
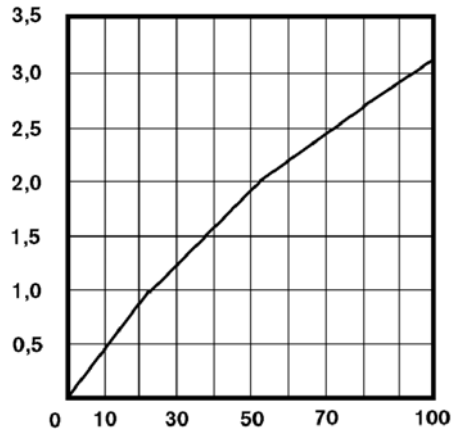
Measurement set-up





Flow range:
2.0 to 120 L/min

Accuracy:
±12 % or ±0.8 L/min
(the higher tolerance value applies)

Figure 36 Measurement set-up

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16 Pressure regulator

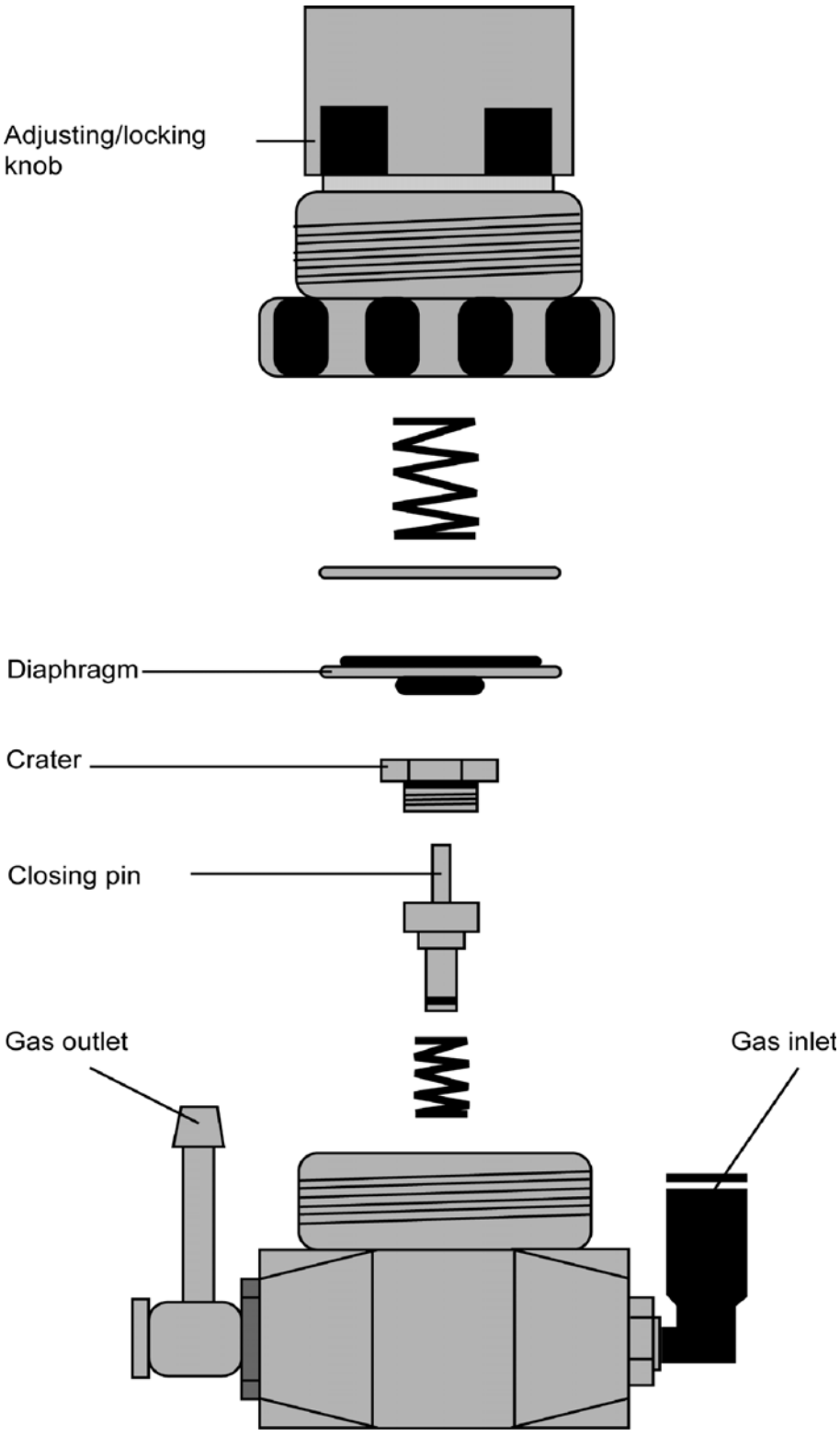

Figure 37 Design of the pressure regulator

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17 Gas inlet

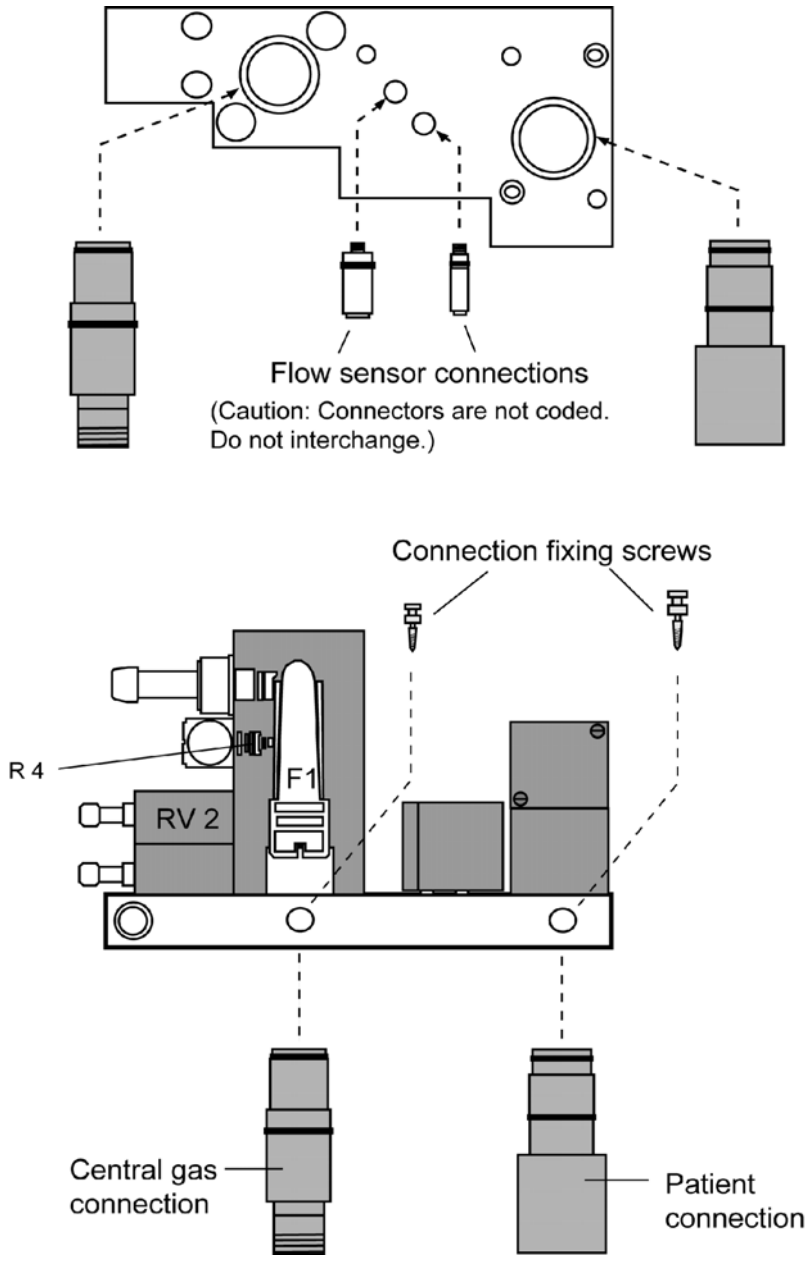

Figure 38 Gas inlet components

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18 MV valve

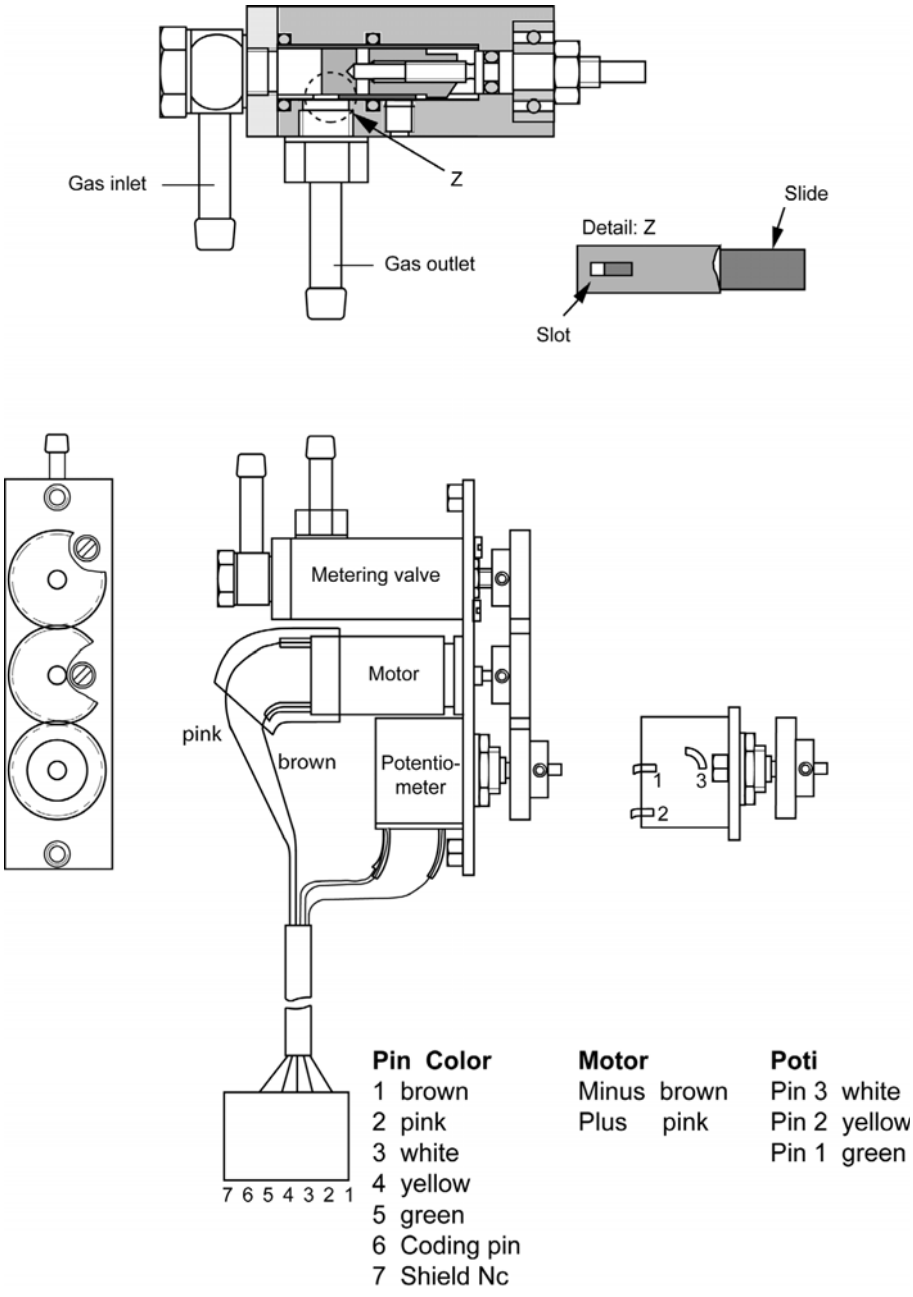

Figure 39 Design of the MV valve

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19 Oxylog 2000 HBO patient valve

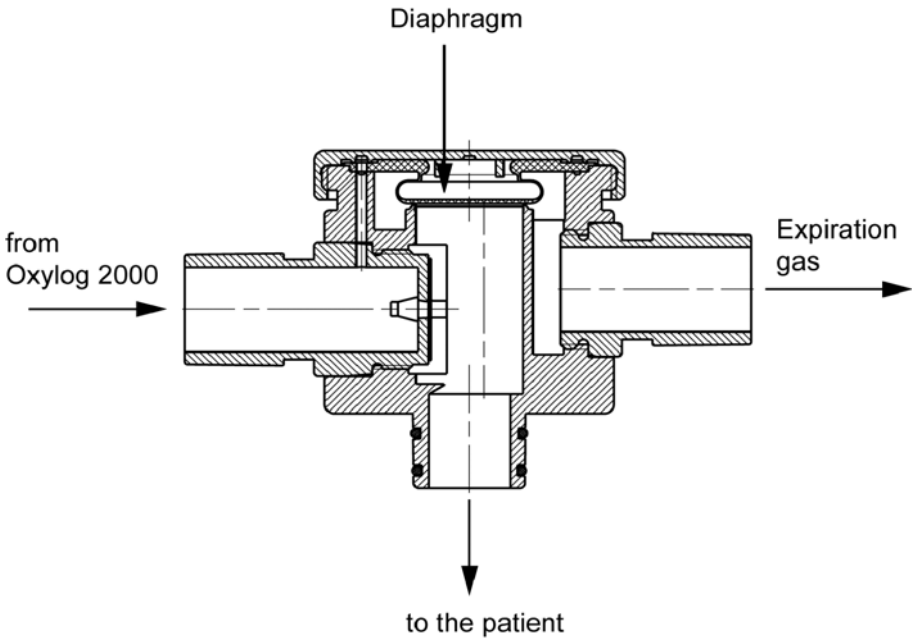

Figure 40 Oxylog 2000 HBO patient valve

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20 Control PCB

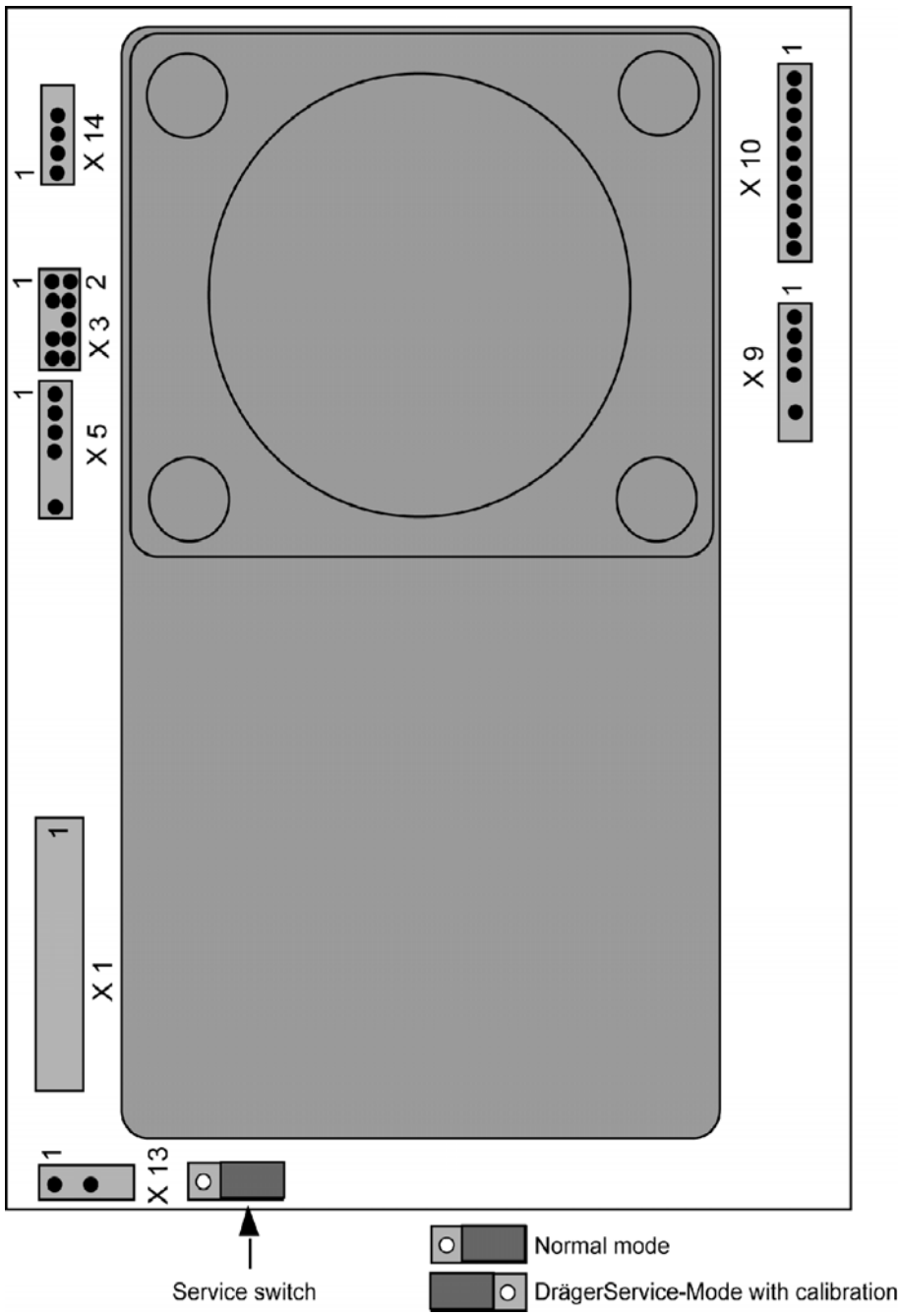

Figure 41 Control PCB

The service switch is no longer functional in software version 2.00 or higher.

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21 Sensor PCB

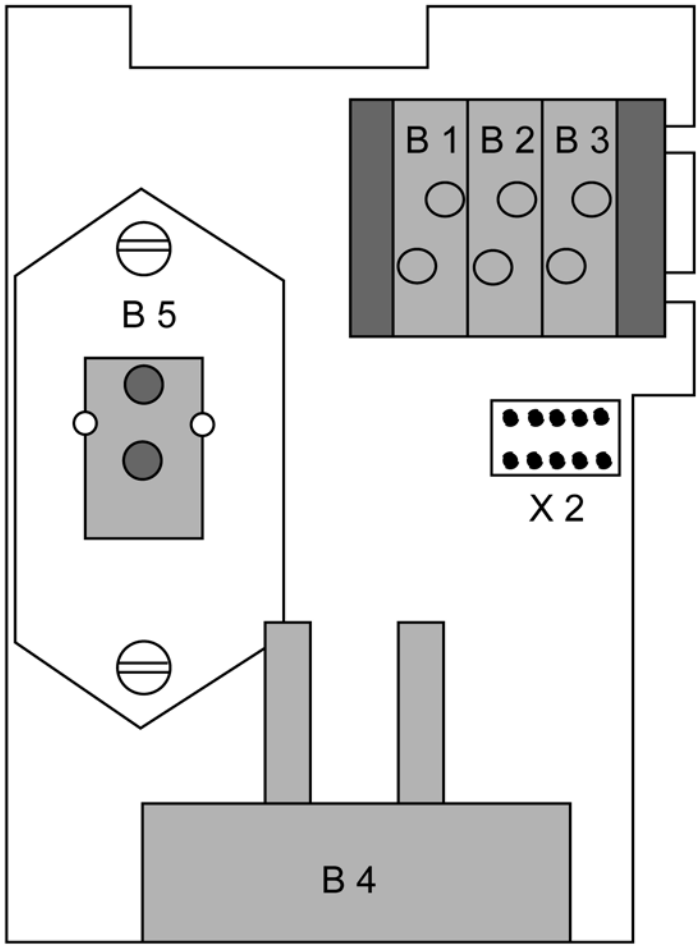

Figure 42 Sensor PCB

Table 7 Legend to Figure 41

Item	Name
B1	P-supply
B2	P-AIRMIX
B3	P-LA
B4	P-flow
B5	P-AW

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22 Display PCB

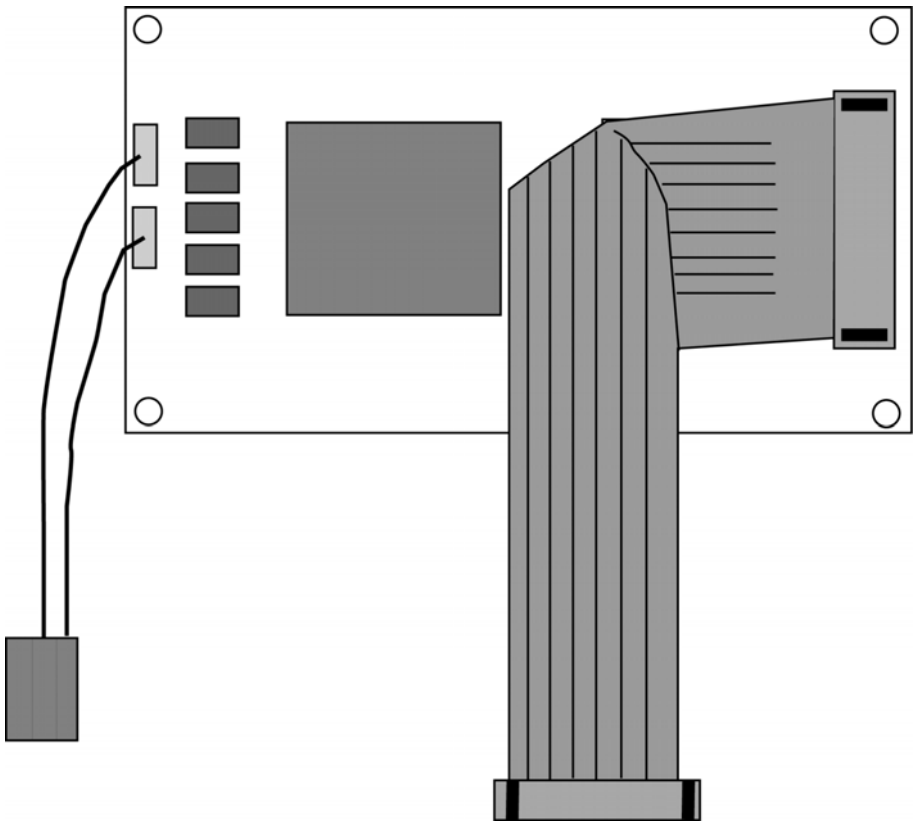

Figure 43 Display PCB

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23 Fuse PCB

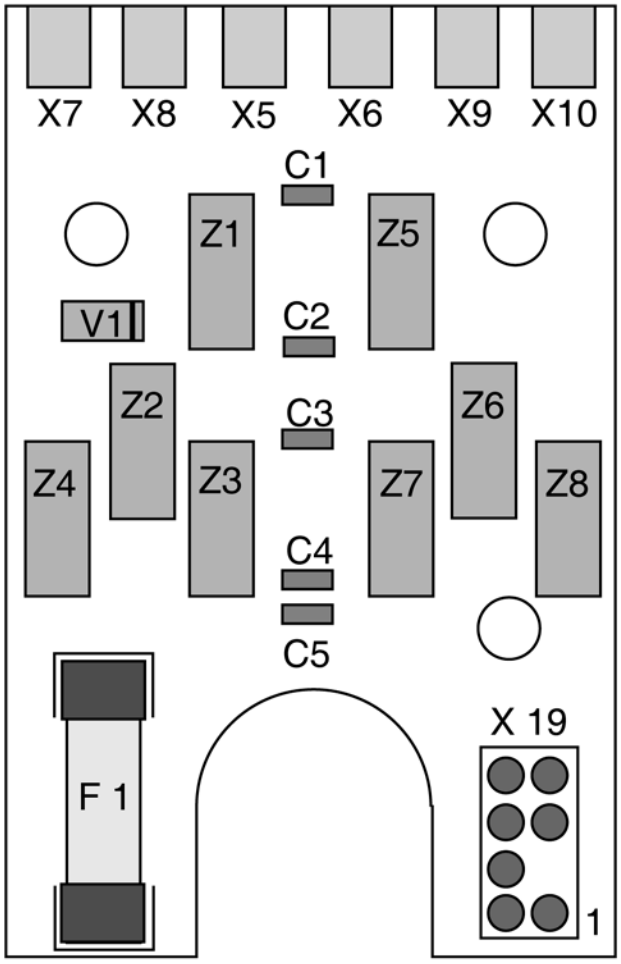

Figure 44 Fuse PCB

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Maintenance Procedures

1 Replacing consumable items

1.1 Replacing/fitting the battery pack

- Find out the replacement intervals of the battery pack by looking in the device log.

Replace the battery pack:

- If message ”Battery faulty” is displayed during charging.
- As a preventive measure every 2 years (check in device log).

1.1.1 Replacement/fitting instructions

- Pull power plug out of power receptacle **1**.
- Loosen screw **2**.
- Pull out the cover of the battery compartment **3**.

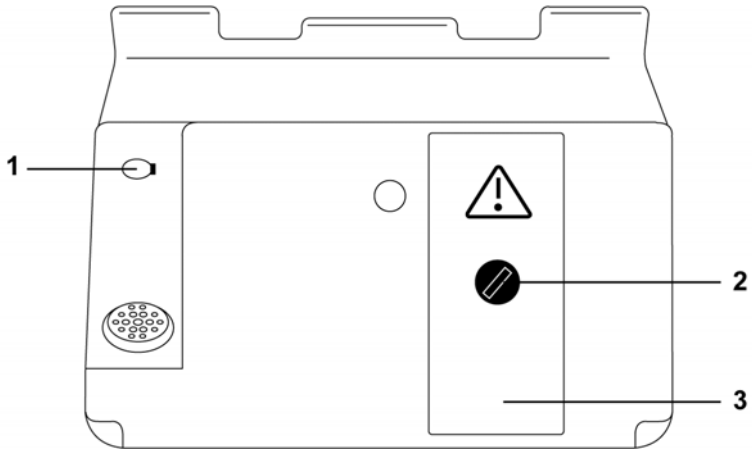

Figure 1 Cover of battery compartment

- Disconnect connector **4** of the battery pack (see Figure 2) from the printed circuit board located in the Oxylog 2000 battery compartment.
- Remove the battery pack **5**.

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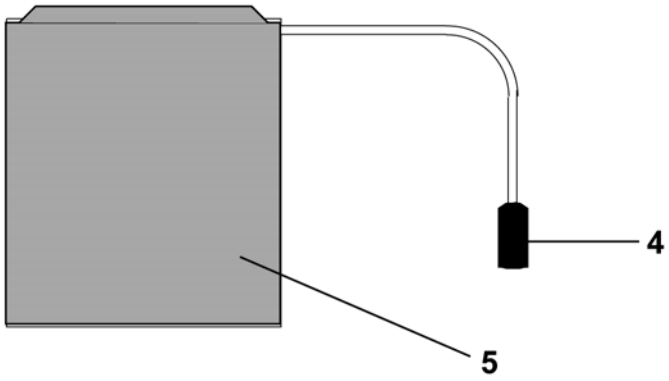

Figure 2 Battery pack

- Fully insert brand-new or recharged battery pack **5** into battery compartment of Oxylog 2000 making sure that cable connection shows upwards.
- Connect connector **4** to printed circuit board of Oxylog 2000 (Note: Connector is pin-coded.).

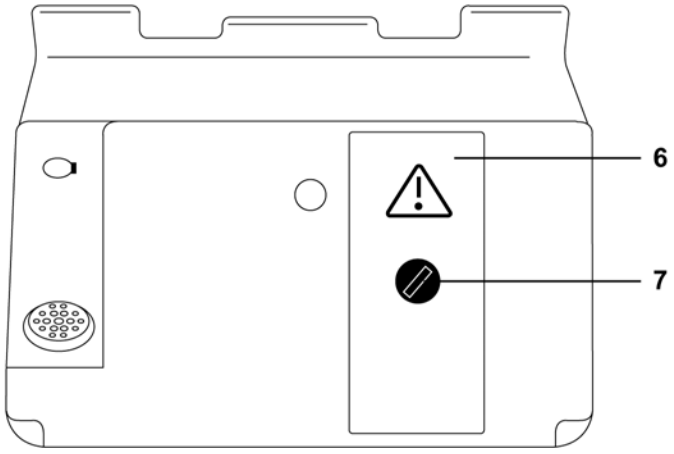

Figure 3 Cover of battery compartment

- Place cover of battery compartment **6** (see Figure 3) onto battery compartment making sure that foam plastic piece is placed against the battery pack.
- Tighten screw **7**.
- Charge battery pack using d.c. voltage from Oxylog 2000 power supply unit or DC/DC converter 84 12 071.

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Display on switched-off device: **Standby, battery charging**. It takes about 5 hours to recharge a completely flat battery pack. Display on device: **Standby, battery charged**.

With a fully-charged battery pack, device can be operated for about 8 hours at room temperature. When operating time has run out, the following will be displayed: Charge battery (approx. 10 minutes of operating time left).

Risk of explosion. Any battery may rupture or explode if forced open, put in a fire or otherwise exposed to excessive heat. Do not force batteries open and do not expose to excessive heat.

Risk of chemical burns. Any battery may leak harmful chemicals which may damage eyes, skin, clothing, or equipment. Do not let any material leaked from a battery come in contact with eyes, skin, clothing, or equipment.

The battery pack is special waste. Dispose of old battery packs according to local waste disposal regulations.

1.2 Replacing/fitting the AlkMn battery pack

Replace internal AlkMn battery pack as soon as message "**Bat. discharged**" is displayed.

Alarm indicator flashes and intermittent alarm sounds.

1.2.1 Replacement/fitting instructions

- Pull power plug out of power receptacle **1**.
- Loosen screw **2**.
- Push cover of battery compartment **3** to the rear and remove.

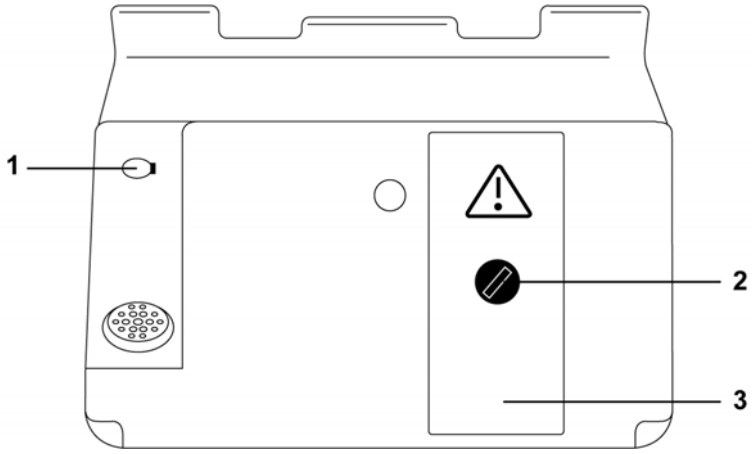

Figure 4 Cover of battery compartment

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- Disconnect connector **4** of battery pack **5** from printed circuit board located in Oxylog 2000.
- Remove battery pack **5**.

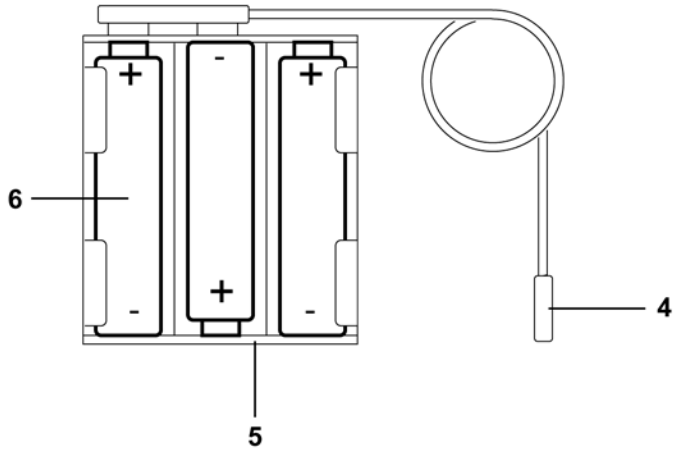

Figure 5 Battery pack

- Remove spent AlkMn batteries **6** (see Figure 5).
- Place brand-new batteries into battery pack **5** making sure that polarity is correct.
- Fully insert battery pack **5** into battery compartment of Oxylog 2000 making sure that cable connection shows upwards.
- Connect connector **4** (see Figure 5) to printed circuit board of Oxylog 2000 (Note: Connector is pin-coded.).

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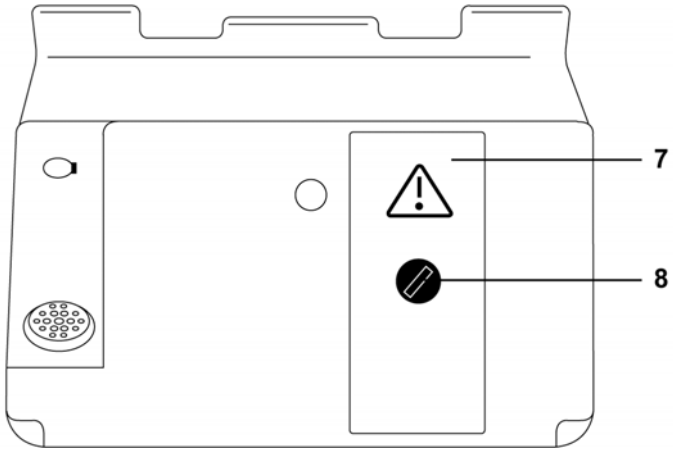

Figure 6 Cover of battery compartment

- Connect connector of battery pack to corresponding socket and put battery pack into battery compartment.
- Fit cover **7** and tighten screw **8**.

With brand-new Alk-Mn batteries the device can be operated for approx. 8 hours. Operating time can be extended by using an external power supply (Oxylog 2000 power supply unit).

Risk of explosion. Any battery may rupture or explode if forced open, put in a fire or otherwise exposed to excessive heat. Do not force batteries open and do not expose to excessive heat.

Risk of chemical burns. Any battery may leak harmful chemicals which may damage eyes, skin, clothing, or equipment. Do not let any material leaked from a battery come in contact with eyes, skin, clothing, or equipment.

AlkMn batteries are not designed to be recharged. To avoid personal injury and/or damage to equipment, do not try to recharge flat AlkMn batteries.

Flat AlkMn batteries are special waste. Dispose of the AlkMn batteries in accordance with local waste disposal regulations.

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1.3 Replacing the pressure regulator

The pressure regulator must be replaced with a brand-new one at 6-year intervals.

- Find out last replacement date of pressure regulator by looking up in the device log.
- Disconnect Oxylog 2000 from power supply unit.
- Disconnect gas supply connectors from compressed-gas supply.
- Disconnect gas supply hoses from Oxylog 2000.
- Disconnect hose system.
- Place Oxylog 2000 on a stable surface.
- Observe antistatic precautions.

1.3.1 Opening the Oxylog 2000

Loosen the screws **1**.

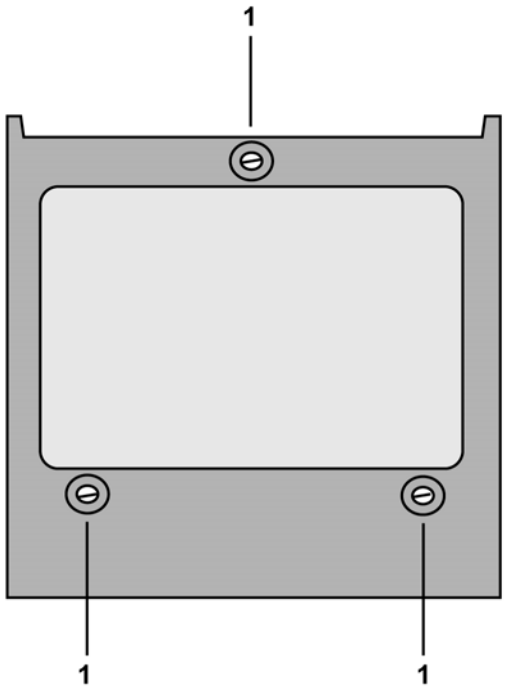

Figure 7 Bottom view of device

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Write down length/size of screws 2 and 3 for later reassembly. If you do not use the same length/size of screws for later reassembly, this may result in device malfunctions or incorrect measurements.

- Remove screws **2**.
- Remove screws **3**.
- Pull out gas connector **4**.
- Pull out patient outlet **5**.

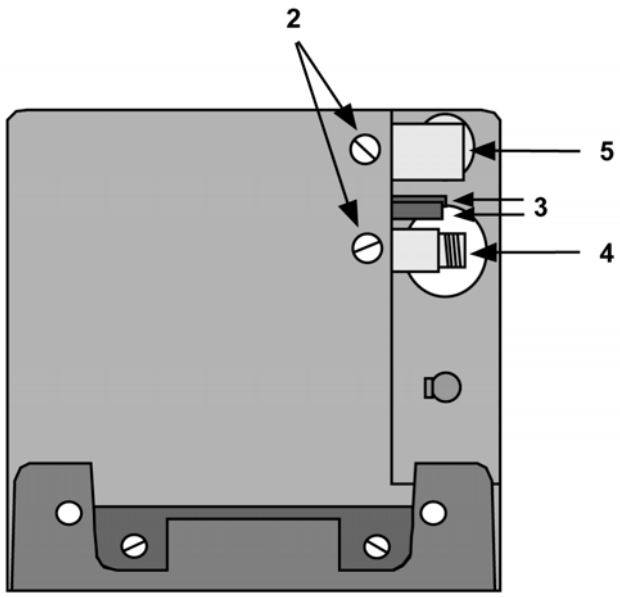

Figure 8 Top view of device

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1.3.2 Removing the plug-in unit

Risk of damage to device. To avoid damage to leads, pull out the plug-in unit slowly.

- Slowly pull out plug-in unit **6**.
- Disconnect cable connectors **7**.

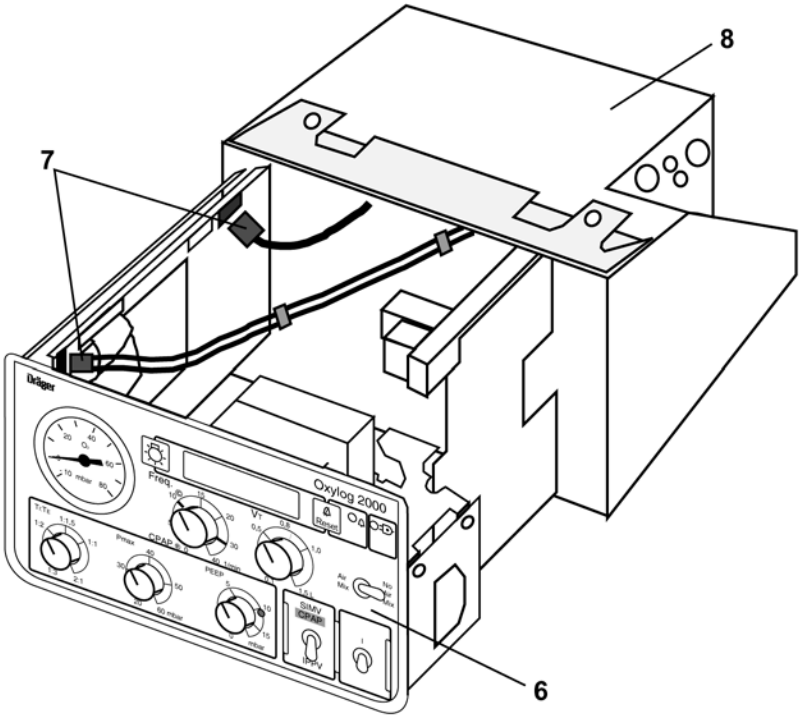

Figure 9 Plug-in unit

- Remove plug-in unit **6**.
- Put housing **8** aside.

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1.3.3 Removing the I:E-, P/N valve fixing plate

- Remove fixing screws **9** of fixing plate **10**.
- Put fixing plate **10** aside.

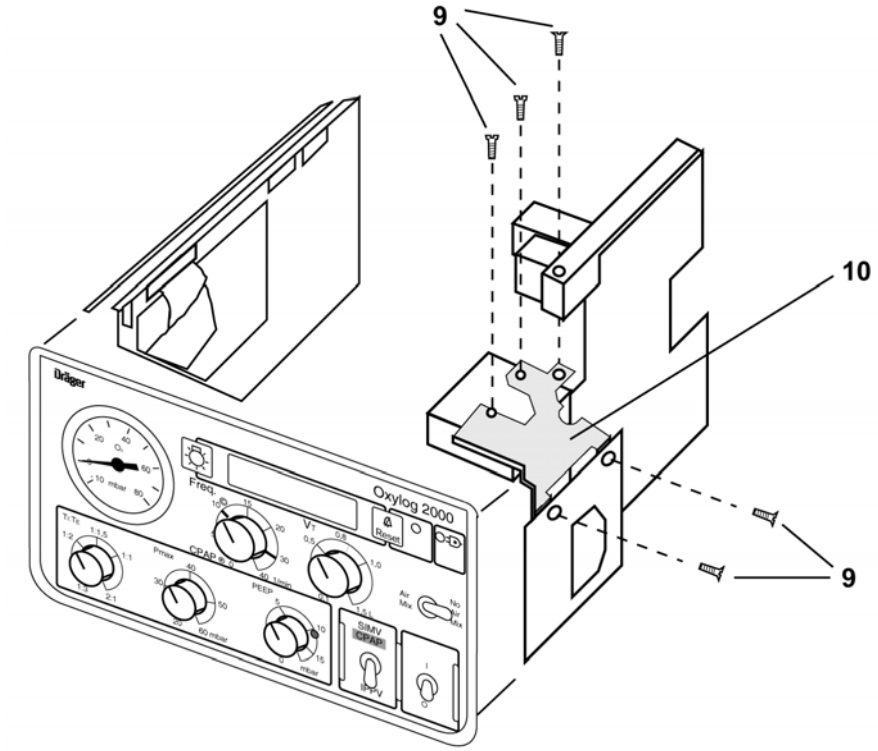

Figure 10 Housing part with fixing plate

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1.3.4 Removing pressure regulator DR 1

- Push in retaining ring **11** and pull out hose **12**.
- Disconnect hose **13**.

Risk of damage to hoses. When removing pressure regulator make sure not to damage any hoses.

- Remove fixing nut **14** using a small combination pliers.

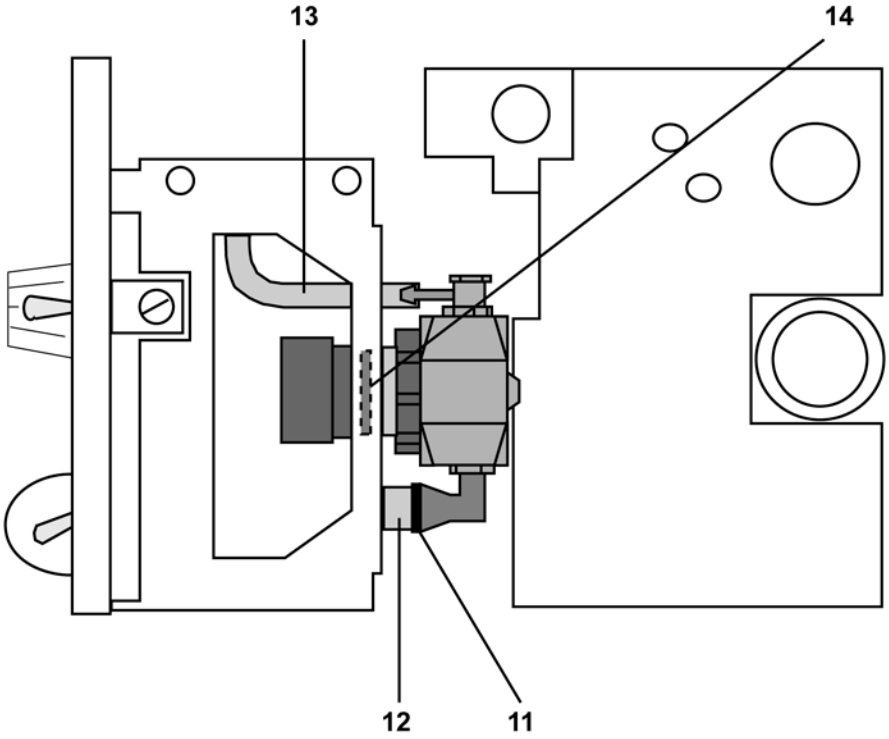

Figure 11 Removing pressure regulator

- Remove old pressure regulator.

The pressure regulator is special waste. Dispose of old pressure regulator according to local waste disposal regulations.

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1.3.5 Closing the new pressure regulator DR 1

Before fitting the new pressure regulator, set it to closed position as follows:

- Unlock adjusting ring **15** (pull towards **A**).
- Rotate adjusting ring **15** counter-clockwise towards **B** as far as it will go.

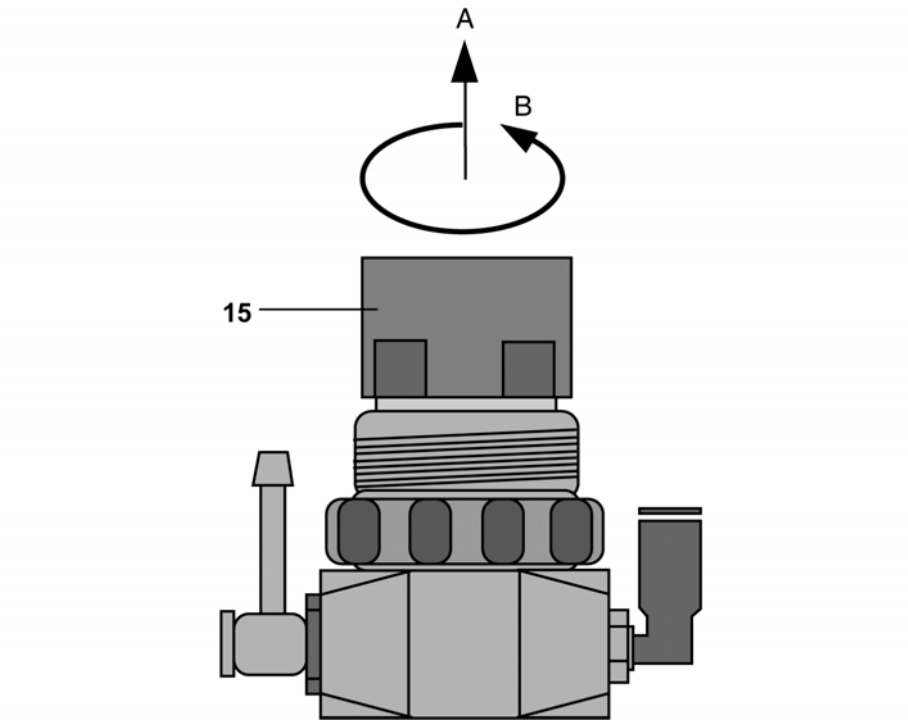

Figure 12 Adjusting pressure regulator

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1.3.6 Adjusting the pressure regulator DR 1

- Using adjusting screw **16** adjust new pressure regulator separately (as shown in the following figure) to 2.4 to 2.6 bar dynamic pressure at a flow rate of 40 L/min (Rotating adjusting ring **16** clockwise will open pressure regulator!).

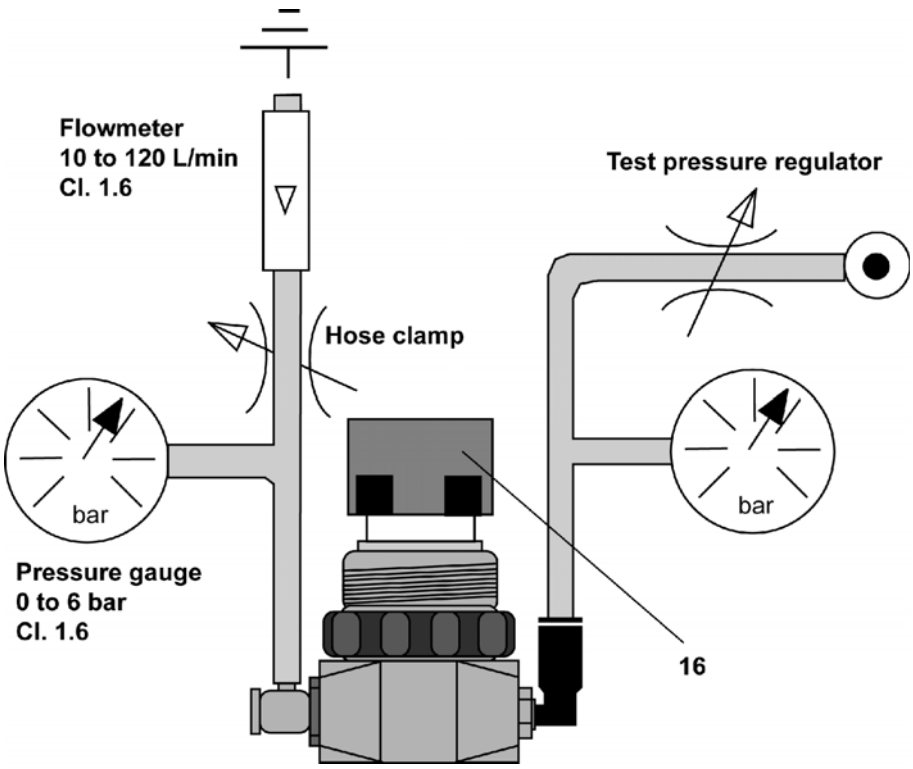

Figure 13 Test set-up

- Adjust the supply gas to 5 bar using the test pressure regulator.
- Adjust flow rate of 40 L/min using hose clamp.
- Adjust new pressure regulator to 2.4 to 2.6 bar.

If flow rate of 40 L/min is not reached, readjust flow rate to 40 L/min again using hose clamp and check and correct setting of pressure regulator.

- Press adjusting ring **16** down to fix set value.
- Close gas supply at test pressure regulator.
- Remove measuring hoses from pressure regulator.

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1.3.7 Fitting the pressure regulator

- Secure new pressure regulator to Oxylog 2000 using fixing nut **17**.

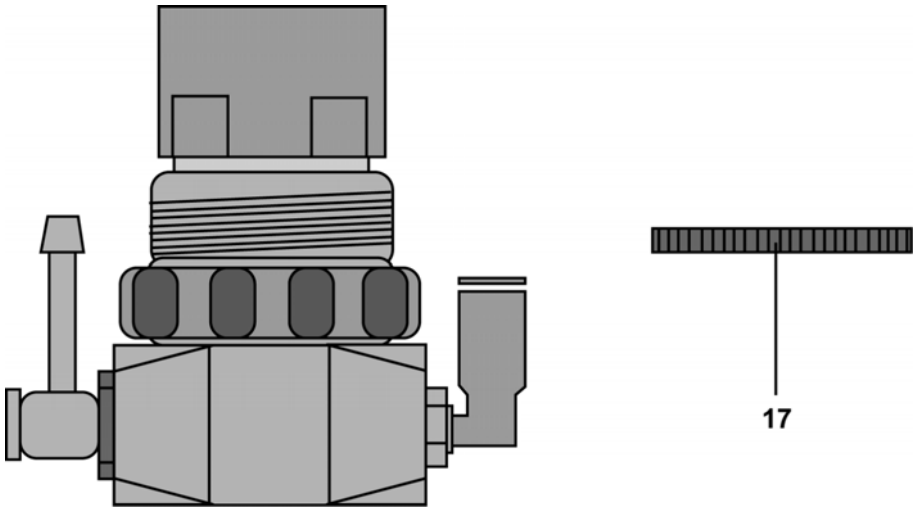

Figure 14 Pressure regulator with fixing nut

- Make sure hose system has no leaks.
- Reassemble the Oxylog 2000 using the reverse order for disassembly.
- Check the Oxylog 2000 using the test list.

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Schematics and Diagrams

1 Printed circuit boards

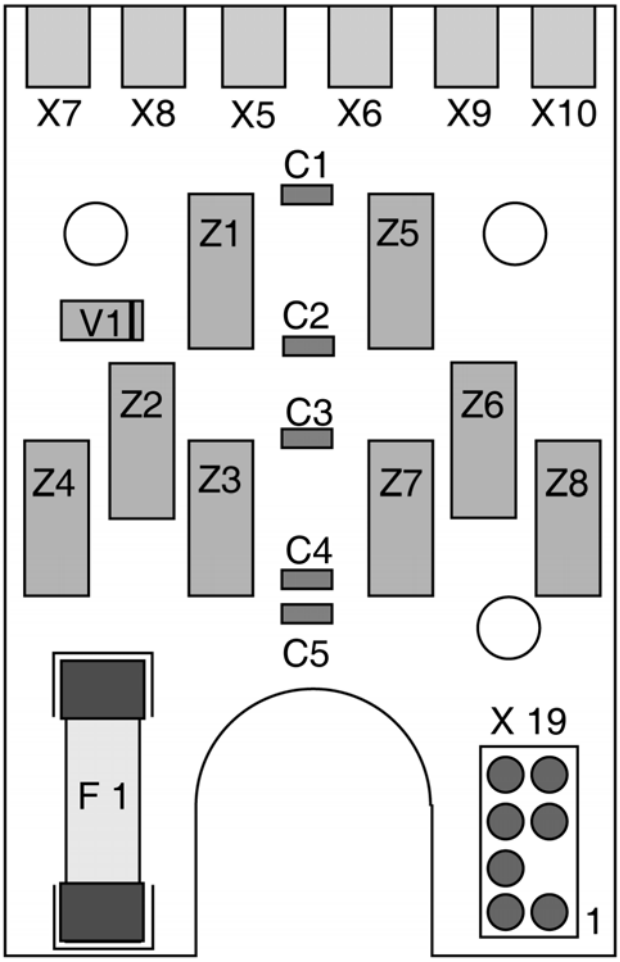

Figure 1 Fuse PCB, component diagram

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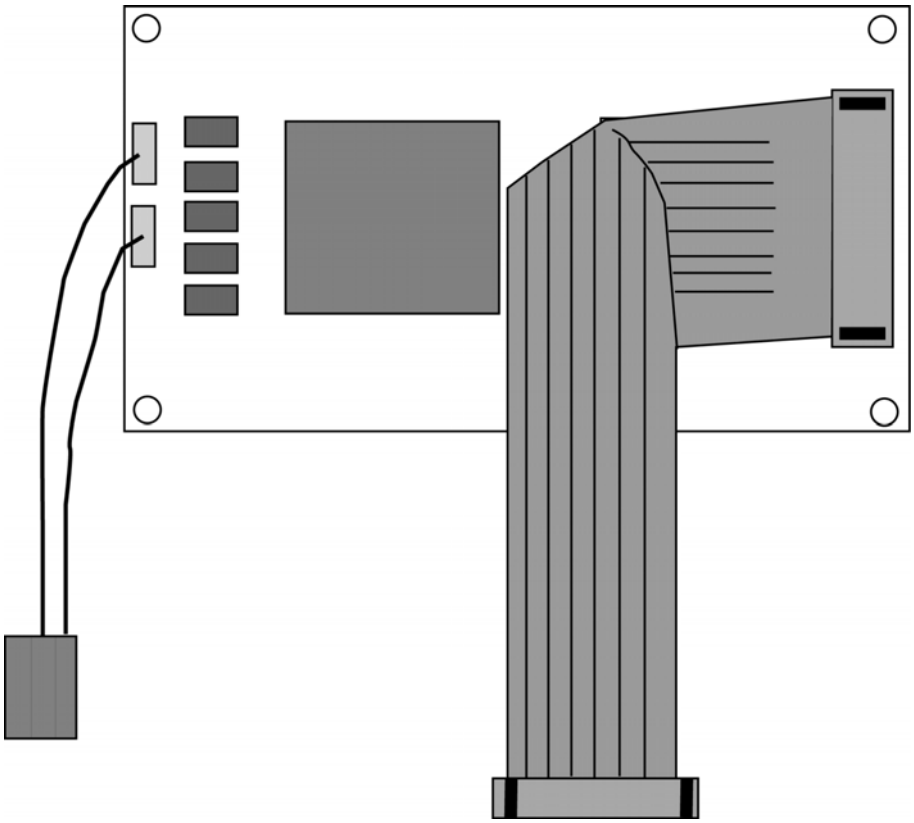

Figure 2 Display PCB, component diagram

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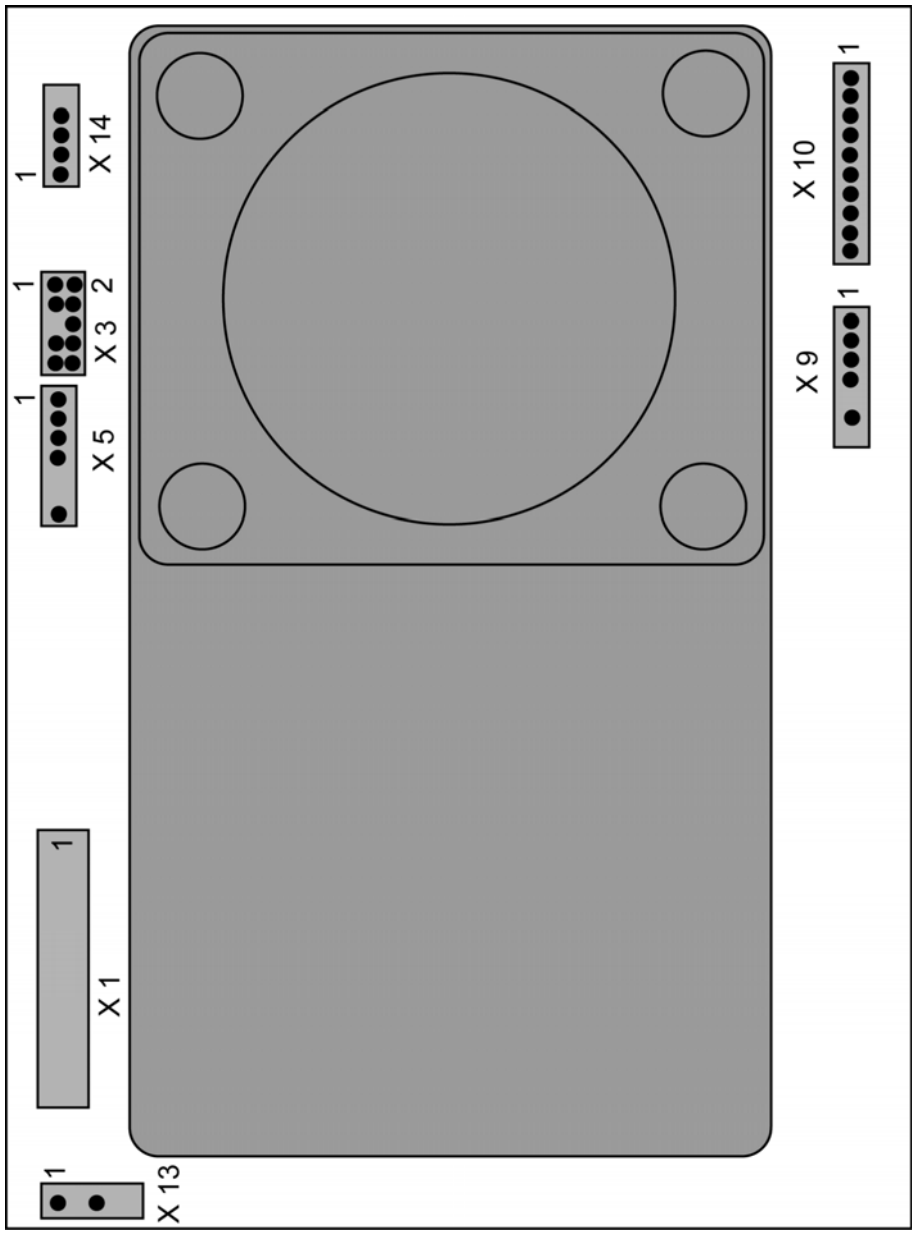

Figure 3 Control PCDB, component diagram

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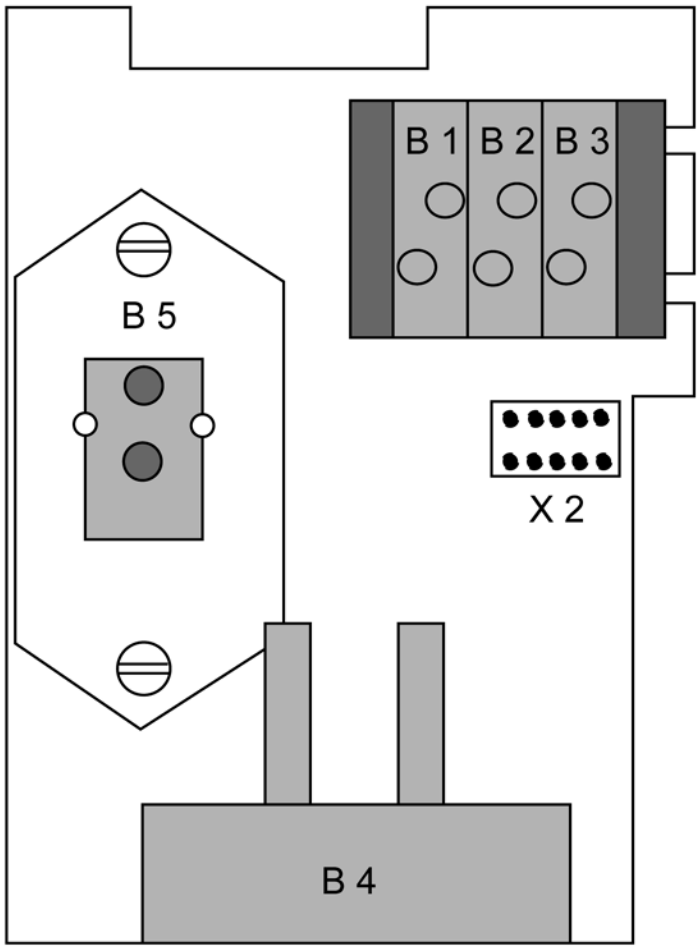

Figure 4 Sensor PCB, component diagram

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2 Tubing and circuit diagrams

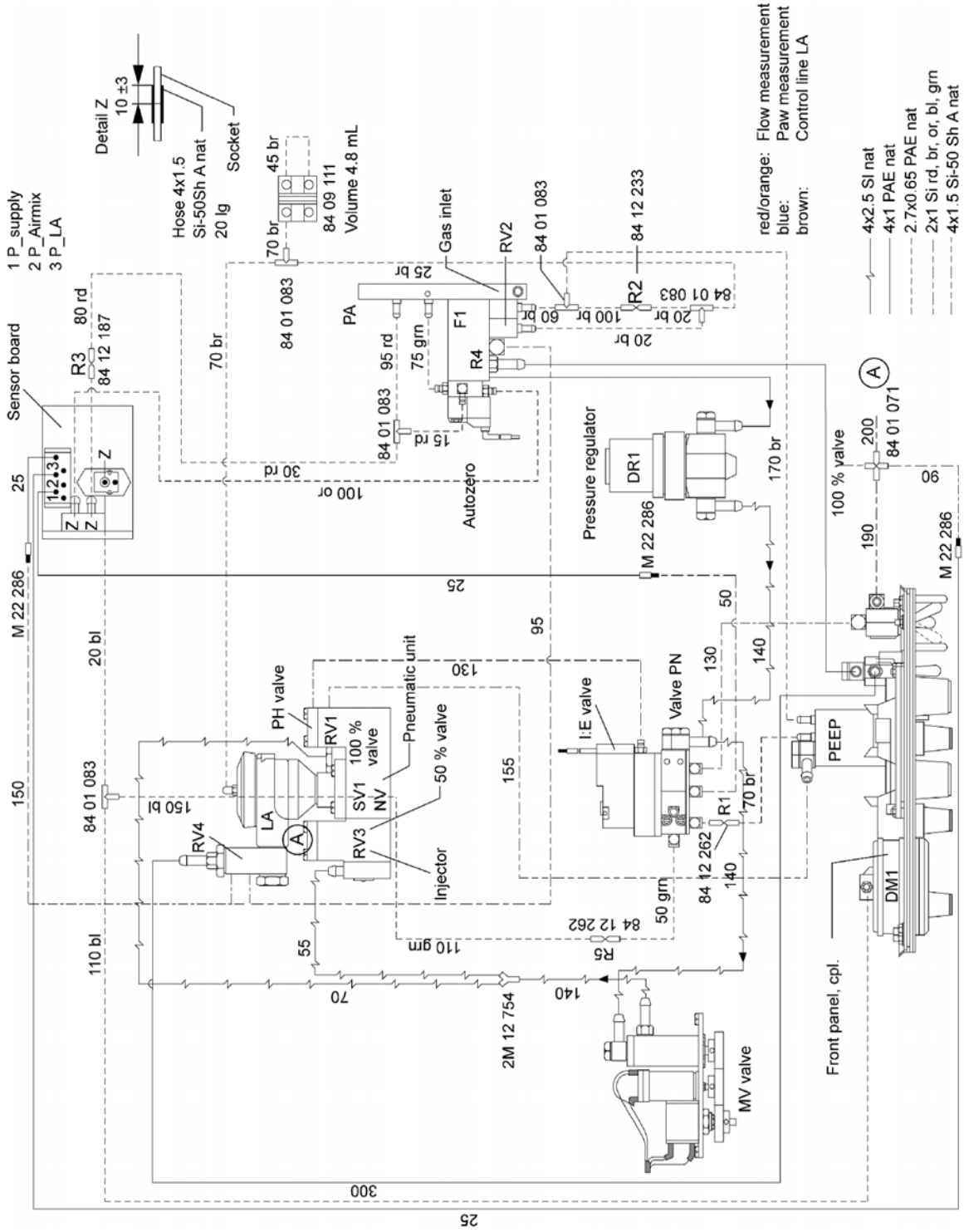

Figure 5 Tubing diagram

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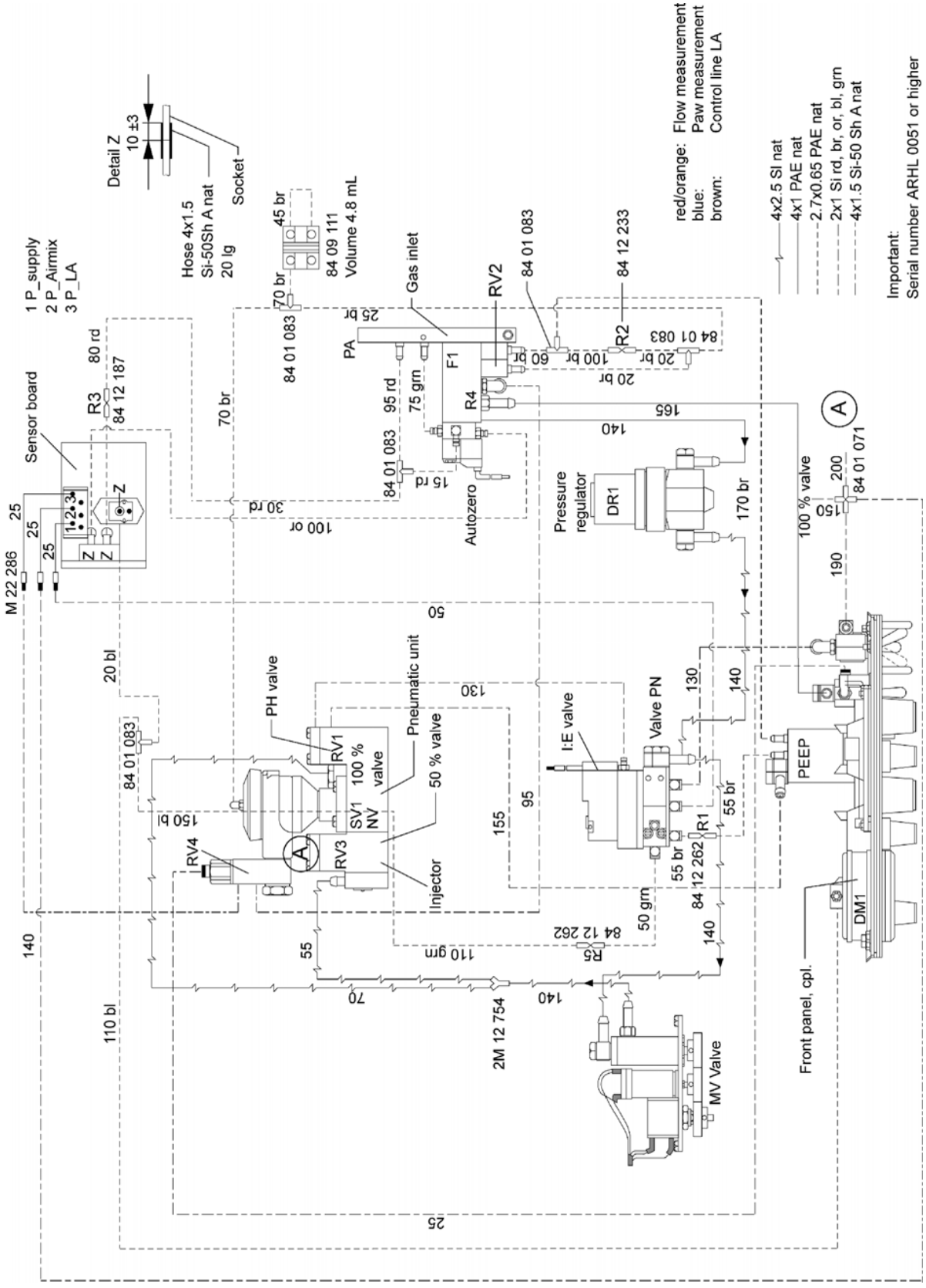

Figure 6 Tubing diagram, serial no. ARHL0051 or higher

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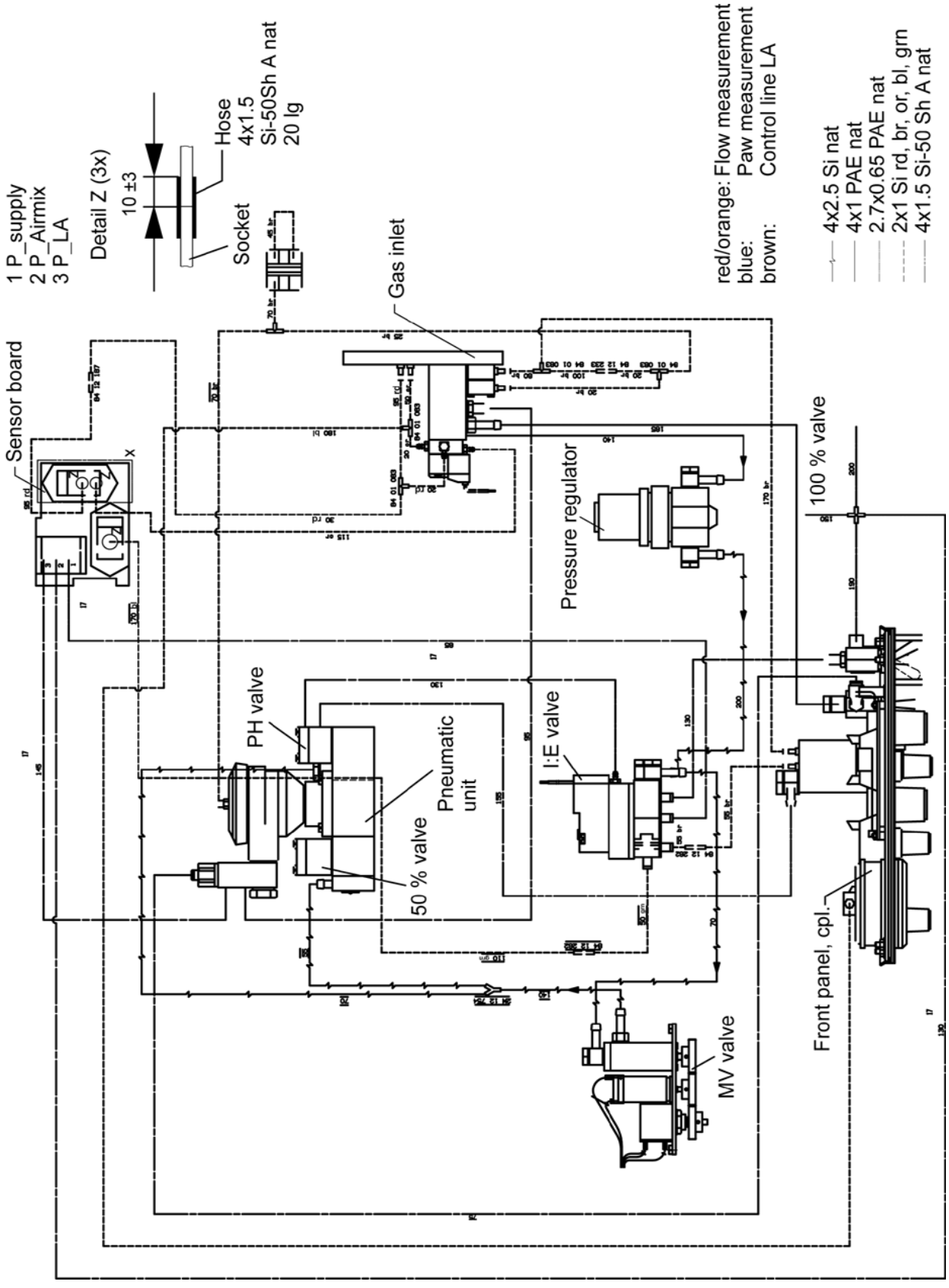

Figure 7 Tubing diagram, SW 3.10 or higher

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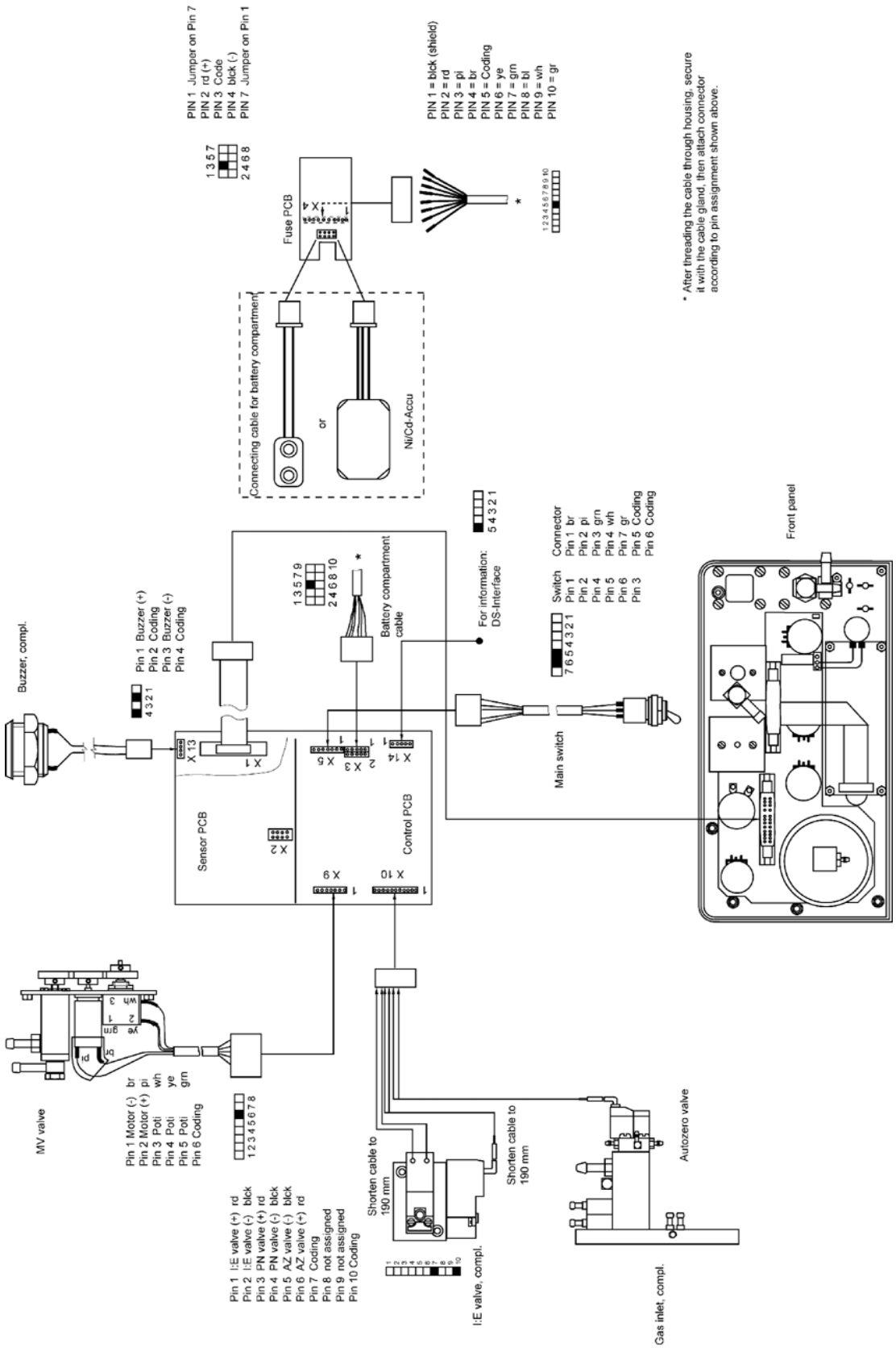
PIN 1 Jumper on Pin 7
PIN 2 rd (+)
PIN 3 Code
PIN 4 blck (-)
PIN 7 Jumper on Pin 1
1 3 5 7
2 4 6 8
Fuse PCB
X4
PIN 1 = blck (shield)
PIN 2 = rd
PIN 3 = pi
PIN 4 = br
PIN 5 = Coding
PIN 6 = ye
PIN 7 = grn
PIN 8 = bl
PIN 9 = wh
PIN 10 = gr
1 2 3 4 5 6 7 8 9 10
* After threading the cable through housing, secure it with the cable gland, then attach connector according to pin assignment shown above.
Connecting cable for battery compartment
or
Ni/Cd-Accu
Front panel
Buzzer, compl.
Pin 1 Buzzer (+)
Pin 2 Coding
Pin 3 Buzzer (-)
Pin 4 Coding
4 3 2 1
X 13
X 1
Sensor PCB
X 2
X 3
X 5
X 14
Control PCB
X 9
X 10
1 3 5 7 9
2 4 6 8 10
Battery compartment cable
For information: DS-Interface
5 4 3 2 1
Switch
7 6 5 4 3 2 1
Main switch
Connector
Pin 1 br
Pin 2 pi
Pin 3 grn
Pin 4 wh
Pin 7 gr
Pin 5 Coding
Pin 6 Coding
Pin 3
MV valve
Pin 1 Motor (-) br
Pin 2 Motor (+) pi
Pin 3 Poti wh
Pin 4 Poti ye
Pin 5 Poti grn
Pin 6 Coding
1 2 3 4 5 6 7 8
Pin 1 I:E valve (+) rd
Pin 2 I:E valve (-) blck
Pin 3 PN valve (+) rd
Pin 4 PN valve (-) blck
Pin 5 AZ valve (-) blck
Pin 6 AZ valve (+) rd
Pin 7 Coding
Pin 8 not assigned
Pin 9 not assigned
Pin 10 Coding
Shorten cable to 190 mm
Shorten cable to 190 mm
1 2 3 4 5 6 7 8 9 10
I:E valve, compl.
Autozero valve
Gas inlet, compl.

Figure 8 Connection diagram

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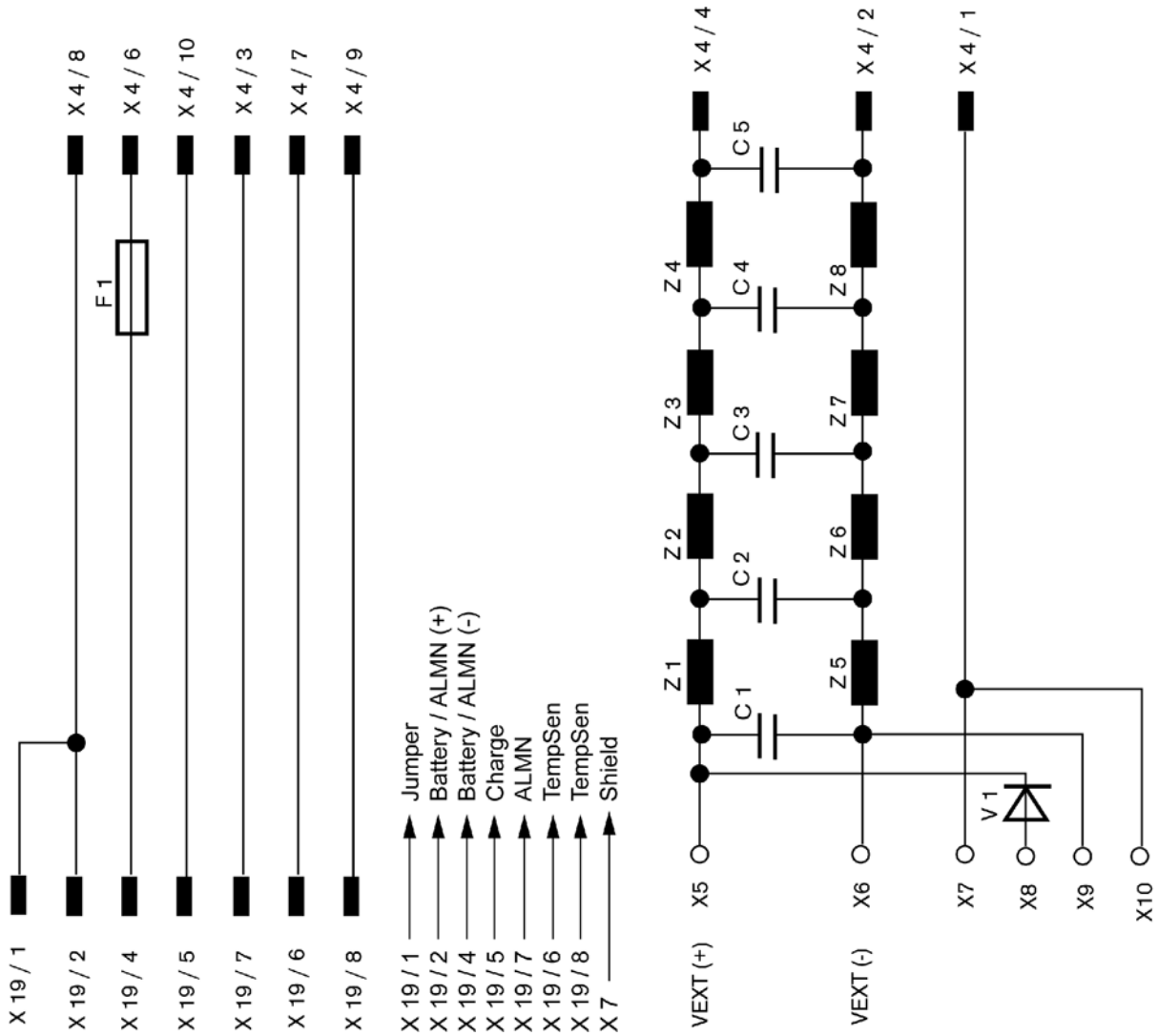

Figure 9 Fuse PCB circuit diagram

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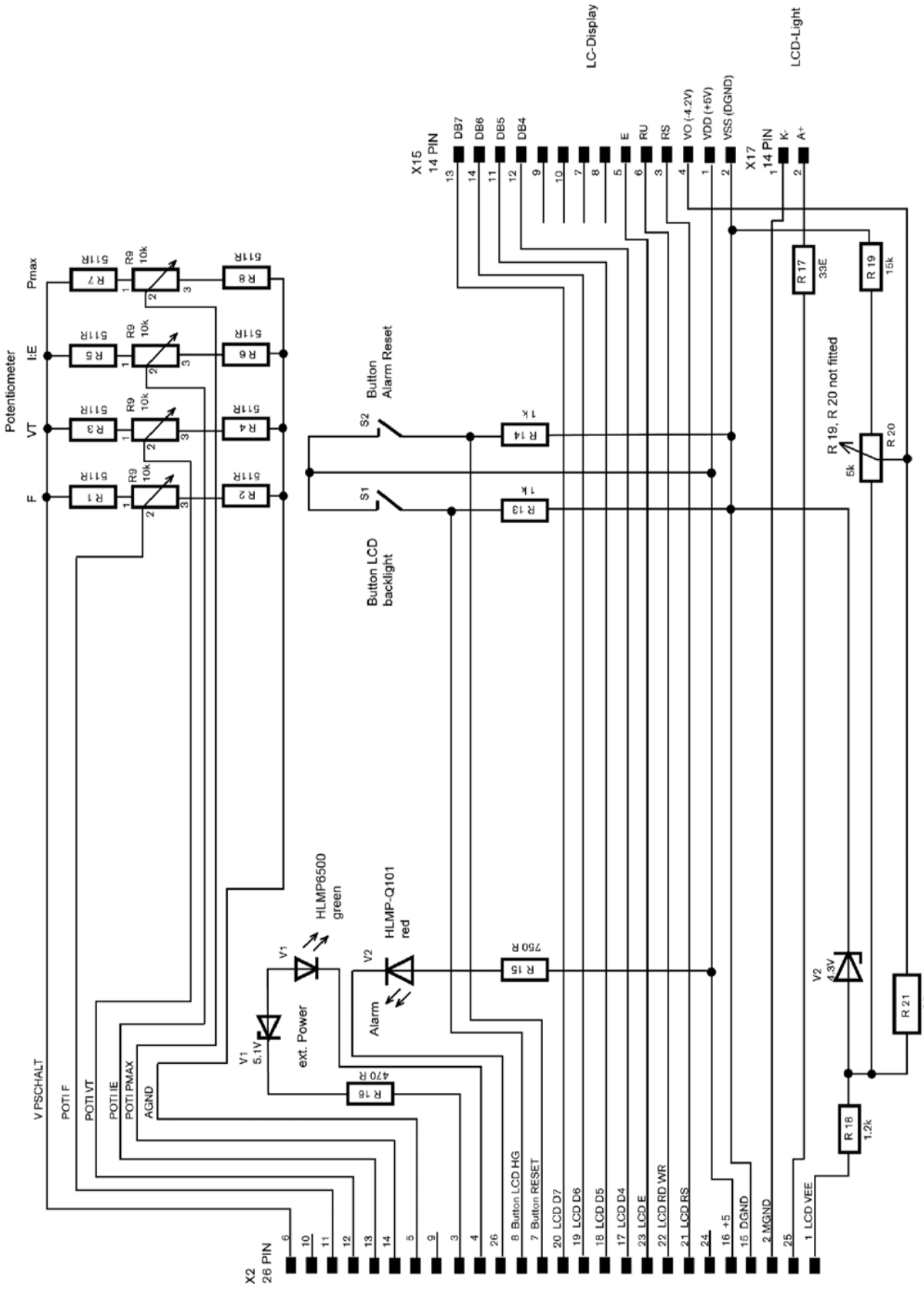

Figure 10 Front Panel PCB circuit diagram

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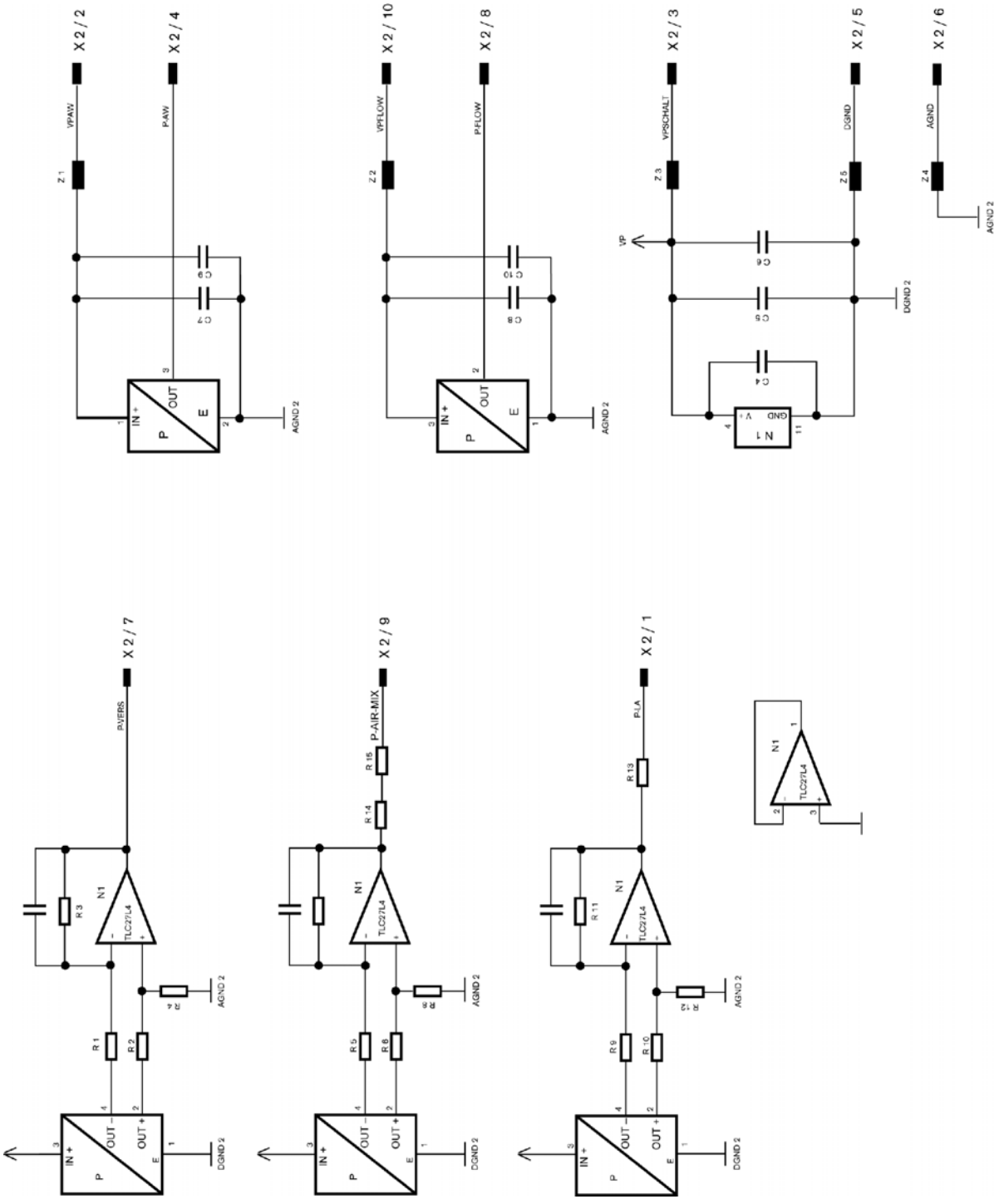

Figure 11 Sensor PCB circuit diagram

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Annex

Parts catalog

Test List

Technical Information

Dräger medical
A Dräger and Siemens Company

Parts catalog

Oxylog 2000

Revision: 2005-09

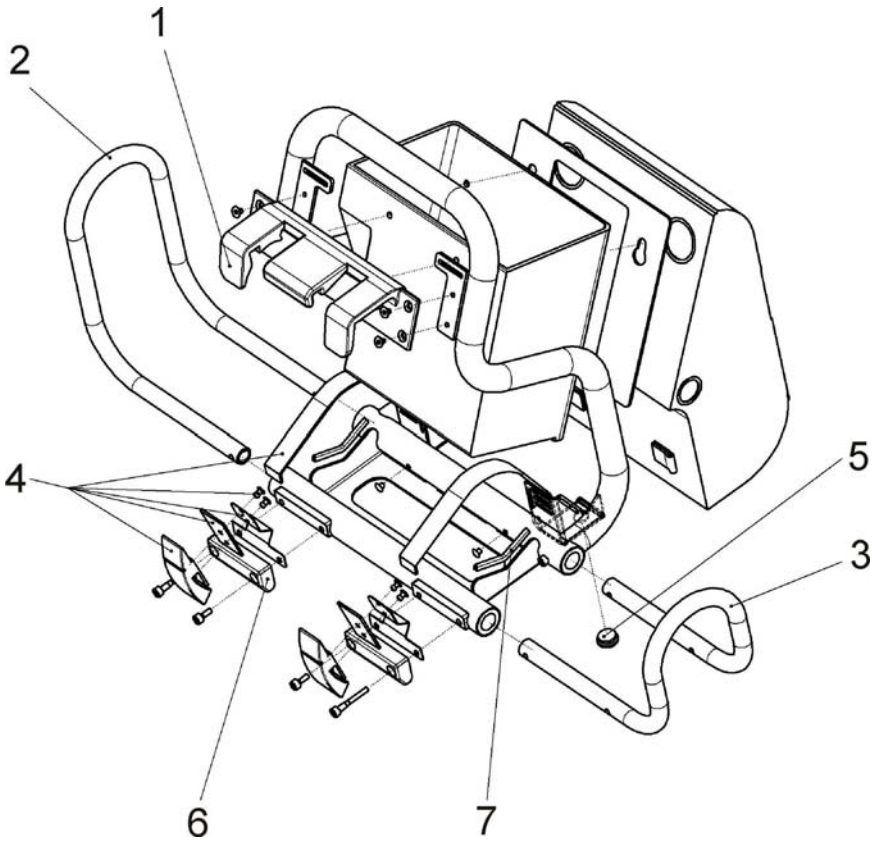
5503.160

Item No.	Part No.	Description	Qty.	Qty.unit	Remark
	5703300	Caddy	1.000	St	

Items that are shown in the illustration but are not listed below the illustration are not available as spare parts

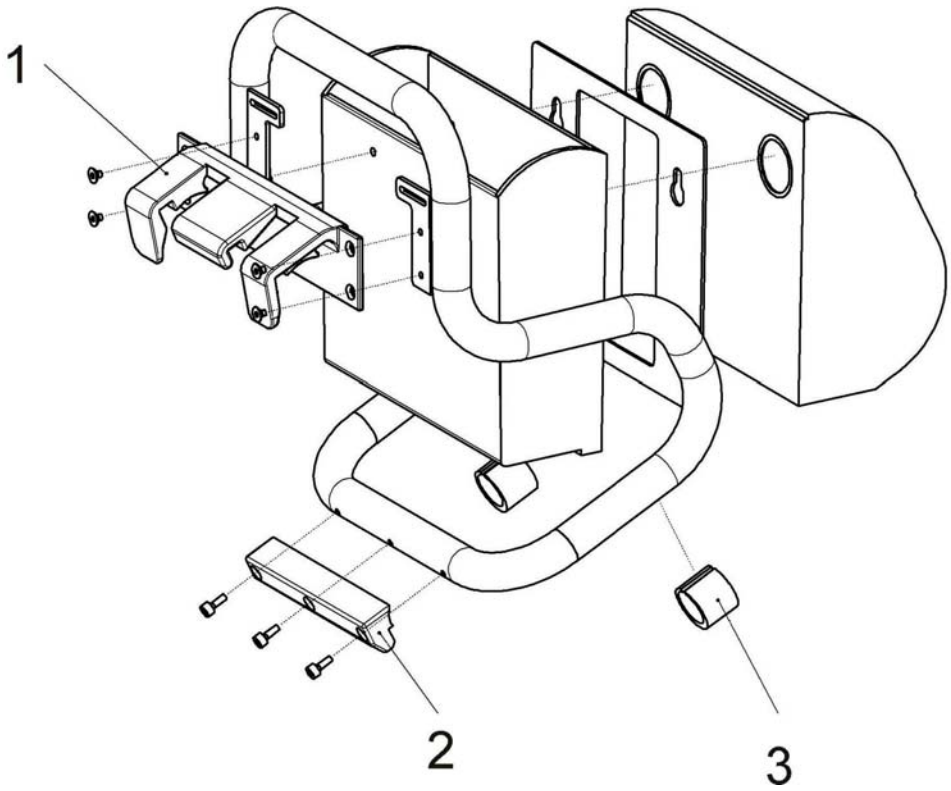
Item No.	Part No.	Description	Qty.	Qty.unit	Remark
1	5703303	BAG OXYLOG 1000 FOR CADDY	1.000	St	
2	5703304	BAG OXYLOG 2000 FOR CADDY	1.000	St	
3	5703305	Bag for CompactCaddy	1.000	St	
4	5703306	PROTECTION COVER	1.000	St	
5	5703307	Carrying Belt	1.000	St	
6	5703308	Wall holder for Caddy	1.000	St	
7	5703309	Wall holder for CompactCaddy	1.000	St	

Items that are shown in the illustration but are not listed below the illustration are not available as spare parts



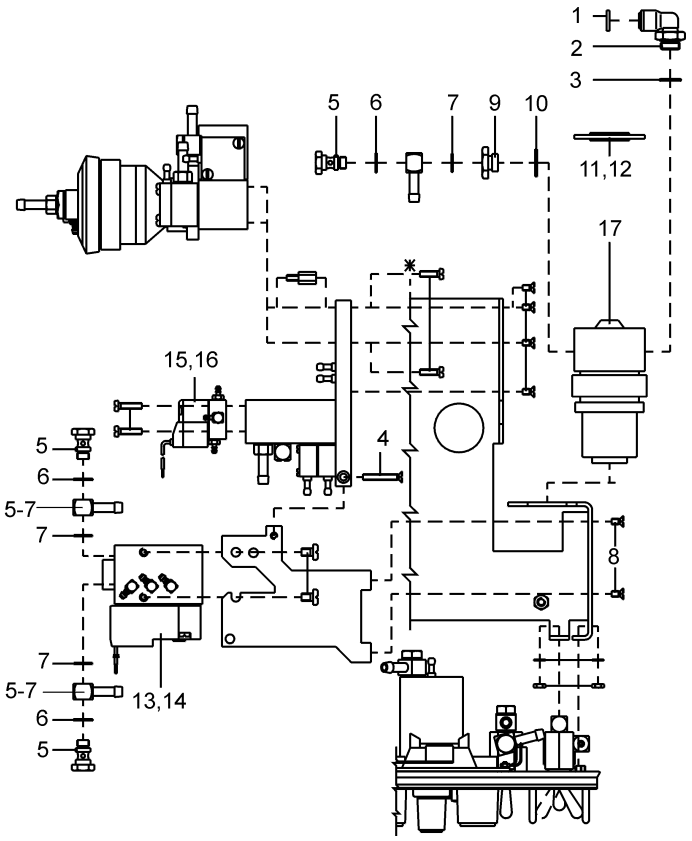
Item No.	Part No.	Description	Qty.	Qty.unit	Remark
1	5703310	CLAW_FOR_CADDY	1.000	St	
2	5703329	PROTECTION BAR HIGH FOR CADDY	1.000	St	
3	5703328	PROTECTION BAR LOW FOR CADDY	1.000	St	
4	5703341	CYLINDER FIXATION SET	1.000	St	
5	5703336	PROTECTION FOOT CADDY	1.000	St	
6	5703340	GUIDING RAIL SET FOR CADDY	1.000	St	
7	5703367	PROTECTION STRIP CADDY	1.000	St	

Items that are shown in the illustration but are not listed below the illustration are not available as spare parts



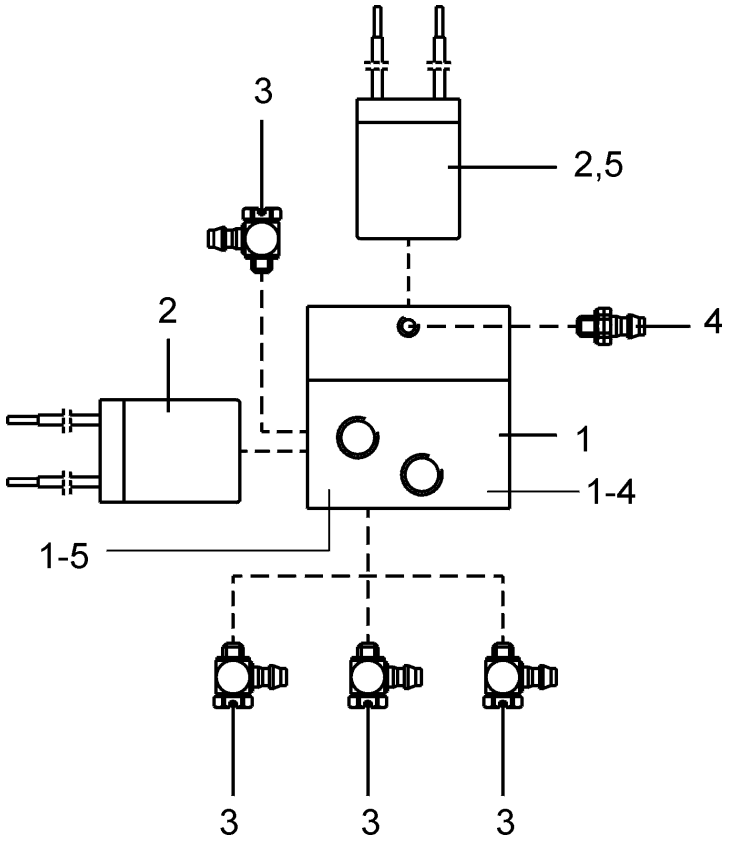
Item No.	Part No.	Description	Qty.	Qty.unit	Remark
1	5703310	CLAW_FOR_CADDY	1.000	St	
2	5703333	GUIDING RAIL FOR COMPACTCADDY	1.000	St	
3	5703335	PROTECTION FOOT COMPACTCADDY	1.000	St	

Items that are shown in the illustration but are not listed below the illustration are not available as spare parts



Item No.	Part No.	Description	Qty.	Qty.unit	Remark
14	8412988	I:E-VALVE	1.000	St	
17	8402745	PRESSURE REGULATOR	1.000	St	

Items that are shown in the illustration but are not listed below the illustration are not available as spare parts



Item No.	Part No.	Description	Qty.	Qty.unit	Remark
1-5	8412988	I:E-VALVE	1.000	St	

Items that are shown in the illustration but are not listed below the illustration are not available as spare parts

Assembly	Description	Part No.
Accessories/Consumables		
	Alduk I O2-DM G3/4	2M86631
	Alduk I O2-DM Pin Index	2M86677
	Alduk II O2-DM G3/4	2M86632
	Alduk II O2-DM Pin Index	2M86678
	Bag for CompactCaddy	5703305
	BAG OXYLOG 1000 FOR CADDY	5703303
	BAG OXYLOG 2000 FOR CADDY	5703304
	Breathing hose 150 cm	2M86511
	Carrying Belt	5703307
	DIAPHRAGM	8403552
	PROTECTION COVER	5703306
	Wall holder for Caddy	5703308
	Wall holder for CompactCaddy	5703309
Caddy		
	CLAW_FOR_CADDY	5703310
	CYLINDER FIXATION SET	5703341
	GUIDING RAIL SET FOR CADDY	5703340
	PROTECTION BAR HIGH FOR CADDY	5703329
	PROTECTION BAR LOW FOR CADDY	5703328
	PROTECTION FOOT CADDY	5703336
	PROTECTION STRIP CADDY	5703367
CompactCaddy		
	CLAW_FOR_CADDY	5703310
	GUIDING RAIL FOR COMPACTCADDY	5703333
	PROTECTION FOOT COMPACTCADDY	5703335
I:E Valve		
	I:E-VALVE	8412988
Maintenance parts/Service kits		
	Akkupack (1000MAH)	8411599
Manual		
	GA OXYLOG 2000 CE ENGL.	9028574
	GA OXYLOG 2000 D/E	9028440
	GA OXYLOG CE DEUTSCH	9028573
	IfU Caddy und CompactCaddy me	9038011
Pneumatic		
	I:E-VALVE	8412988
	PRESSURE REGULATOR	8402745
Product concerned		
	Caddy	5703300

Test List

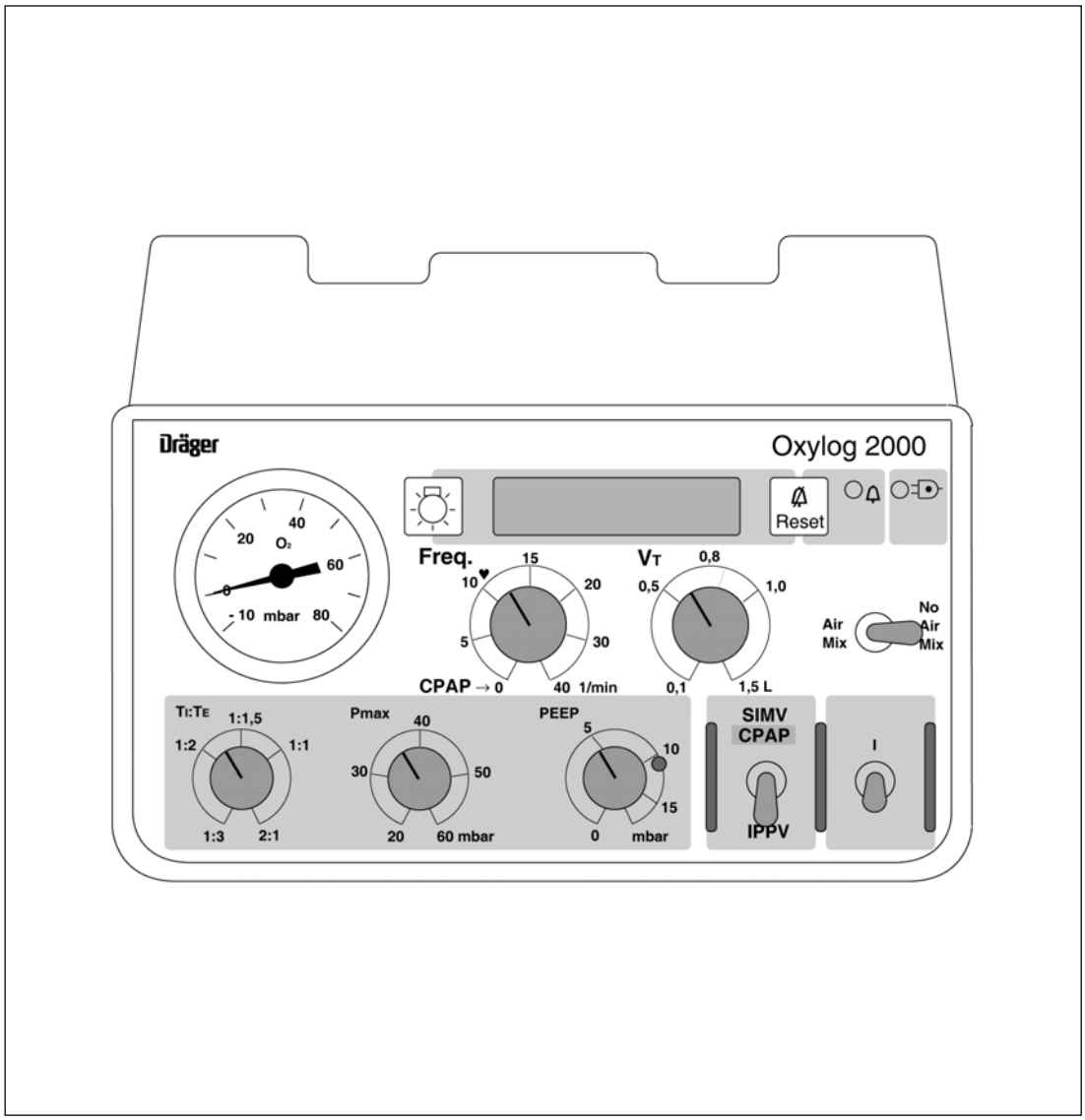
Oxylog 2000

Serial no.: _____

Installation site: _____

File no.:
5503.160

Edition:
11/97



This test list can be processed with standard commercially available test aids and tools, but does not replace the inspections and maintenance work carried out by the manufacturer.

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1 Required Test Equipment

	Range	Accuracy class
Test pressure regulator		
Flowmeter	10 to 120 L/min	1.6
Pressure gauge	–30 to +120 mbar	1.0
Injector		
Stopwatch		
Test lung, 2 L, ISO		

2 Accompanying documents (Germany only)

Instructions for Use

Device log

Instructions for Use/Operating Instructions of accessories ☐

3 General condition of Oxylog 2000

Housing

Front panel

Rear panel

Markings are clearly legible ☐

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4 General condition and checking of required accessories

Compare fuses with values specified in the Instructions for Use/Operating Instructions and/or on the rear panel.

Connecting tubes

Ventilation valve

Vehicle device mount

Battery holder

Connecting cable for battery holder

Batteries/rechargeable battery pack

DC/DC converter

Power pack, 12 VDC

Support plate

Carrying strap ☐

5 Functional check

Connect device to gas supply and switch device on.

During the power-on test the device displays the software version. LC display and alarms are activated. The device gives two audible alarms and displays "Self-test o.k". ☐

6 Pressure monitoring

Disconnect the device from the gas supply.

The alarm message "Supply pressure low" appears. ☐

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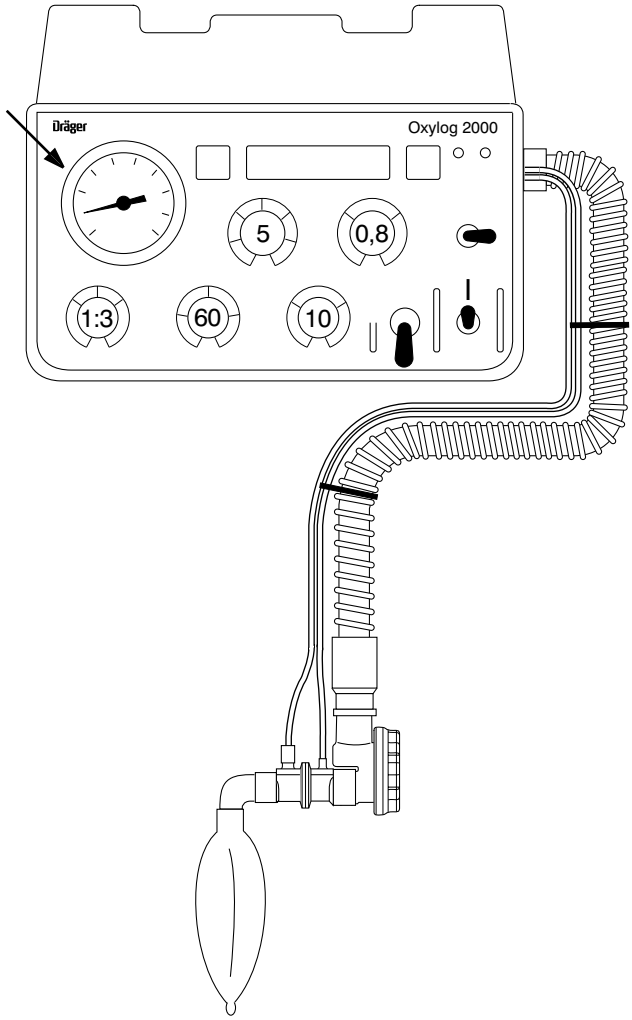
7 Leak test

Reconnect the device to the gas supply and connect the test lung 8403201, 2 L ISO, to the patient connector.

Settings on the device: IPPV, No Air Mix



The needle of the built-in pressure gauge should not oscillate during expiration. ☐

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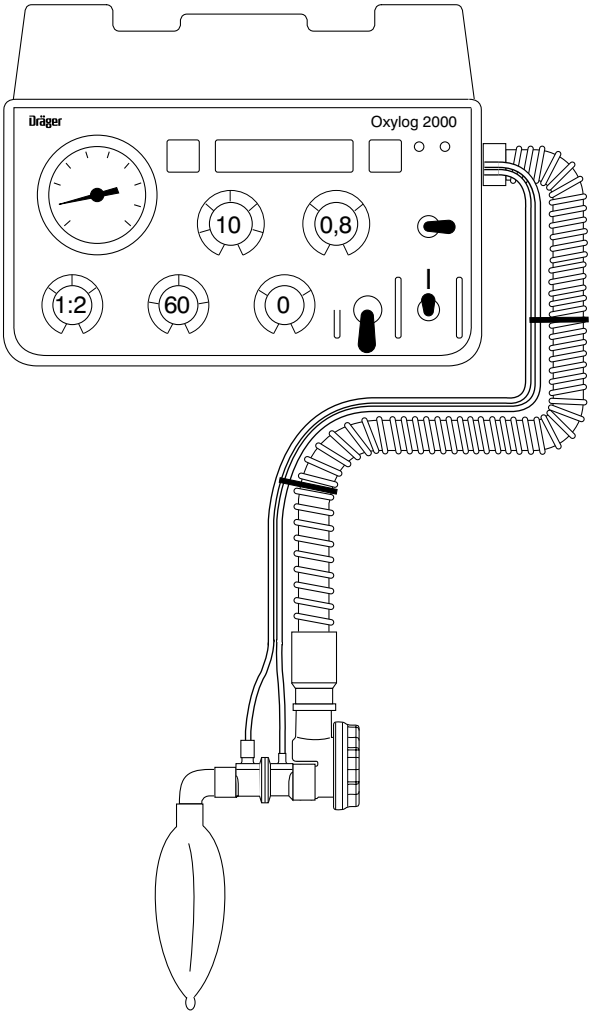
8 Frequency test

Settings on the device: IPPV, No Air Mix



The frequency should be 10 ±2 1/min. ☐

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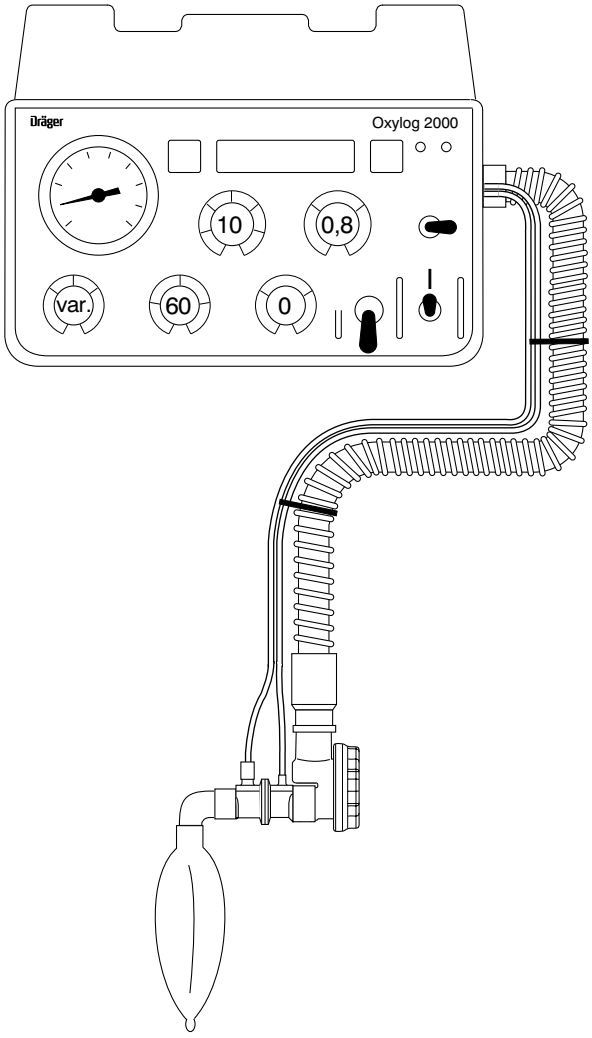
9 I:E ratio

Settings on the device: IPPV, No Air Mix



At a TI:TE ratio of 1:3 the calculated value should be 0.3 ±10%.
At a TI:TE ratio of 2:1 the calculated value should be 2 ±10%.

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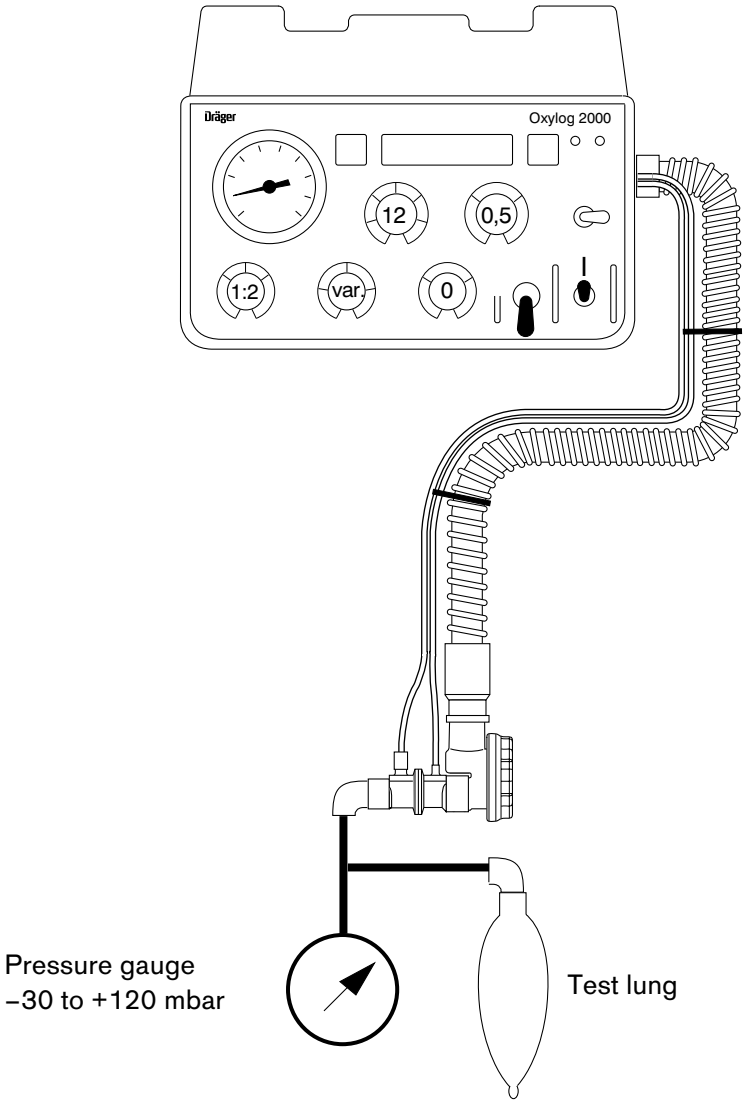
10 Pmax test

Settings on the device: IPPV



Adjust the following Pmax values: 40, 60 mbar While compressing the test lung read the pressure gauge. The Pmax pressure switch should operate at 40 ±3 mbar and 60 ±3 mbar and the alarm should be activated.

Ventilation pressure gauge comparative measurement
The tolerance is ±2.5 mbar.

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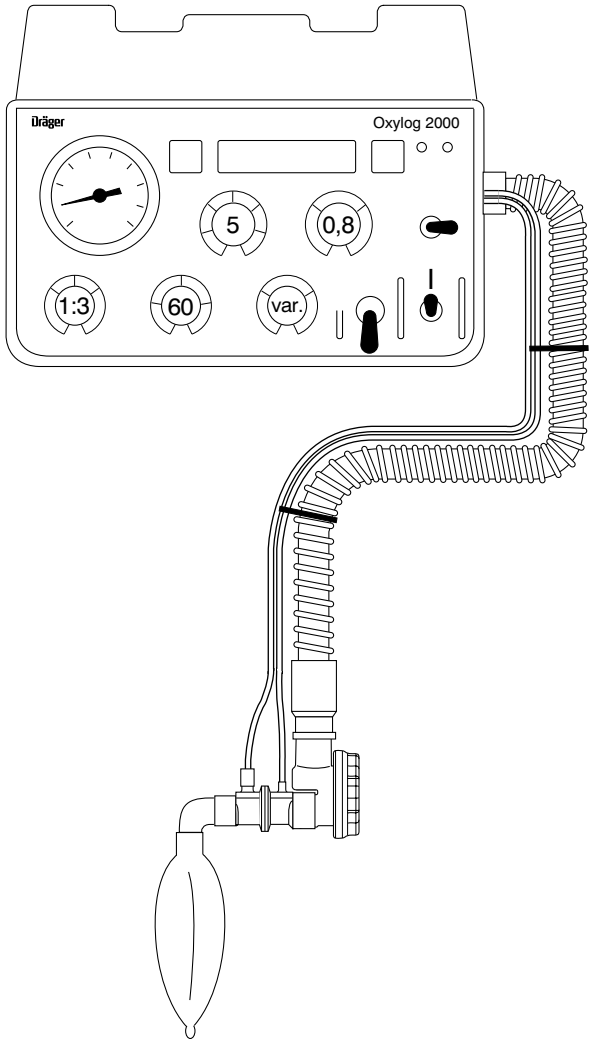
This test list can be processed with standard commercially available test aids and tools, but does not replace the inspections and maintenance work carried out by the manufacturer.

11 PEEP setting

Settings on the device: IPPV, No Air Mix



Adjust the following PEEP values: 0, 10, 15 mbar
Test values:0 = 0 +2 mbar
10 = 10 ±2 mbar
15 = 15 ±2 mbar.

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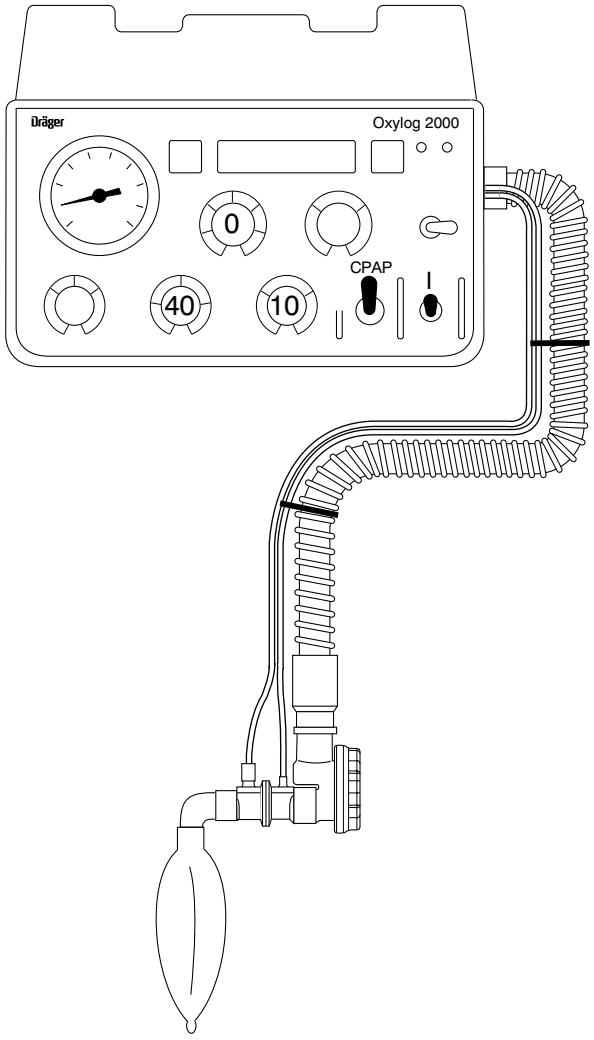
12 CPAP function

Settings on the device: CPAP



Simulate breathing.
The connected test lung inflates automatically. ☐

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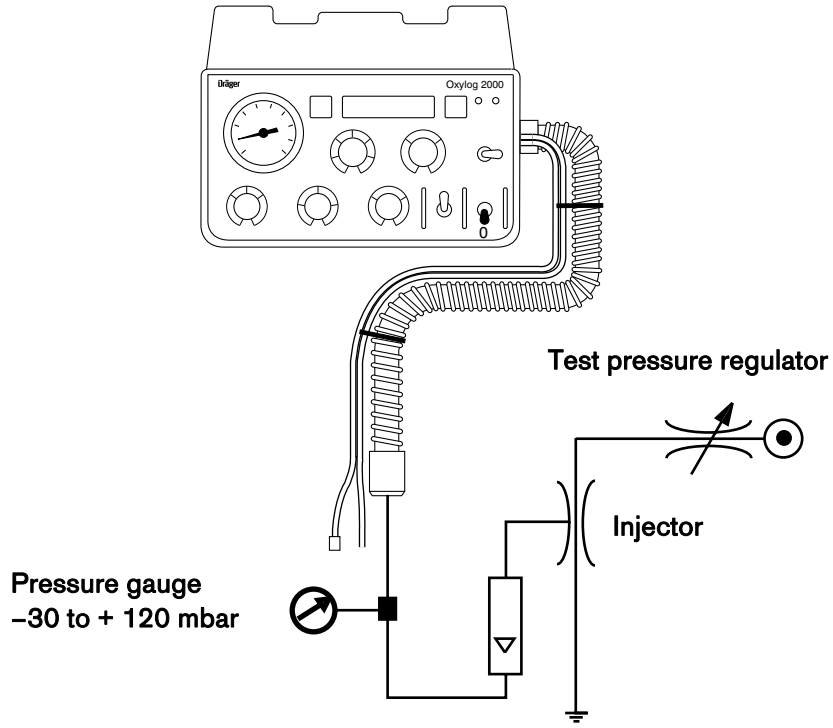
13 Emergency air valve

Disconnect the device from the gas supply and switch the device off.



Generate an intake flow of approx. 25 L/min using the injector. The maximum opening pressure should be –11.5 mbar. ☐

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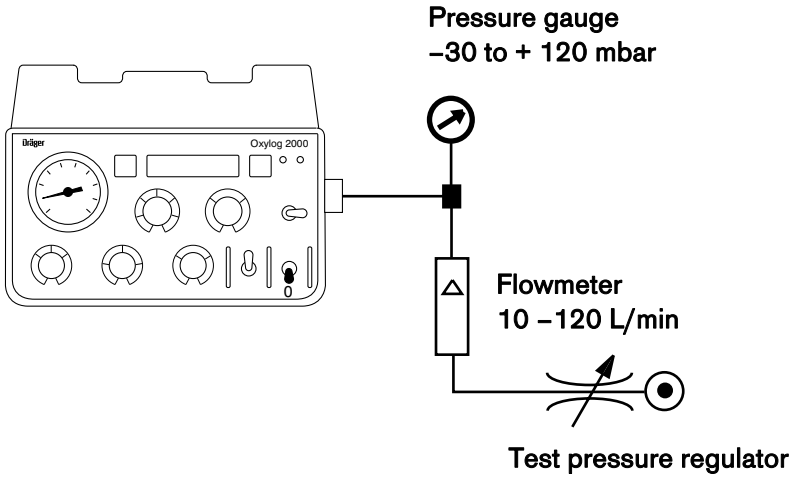
14 Safety valve

Supply a flow of 50 L/min or 20 L/min (as from SW 3.n), respectively, through the inspiratory connection.



The safety valve vents at a pressure of 70 ±10 mbar or 70 ±5 mbar (as from SW 3.n), respectively. ☐

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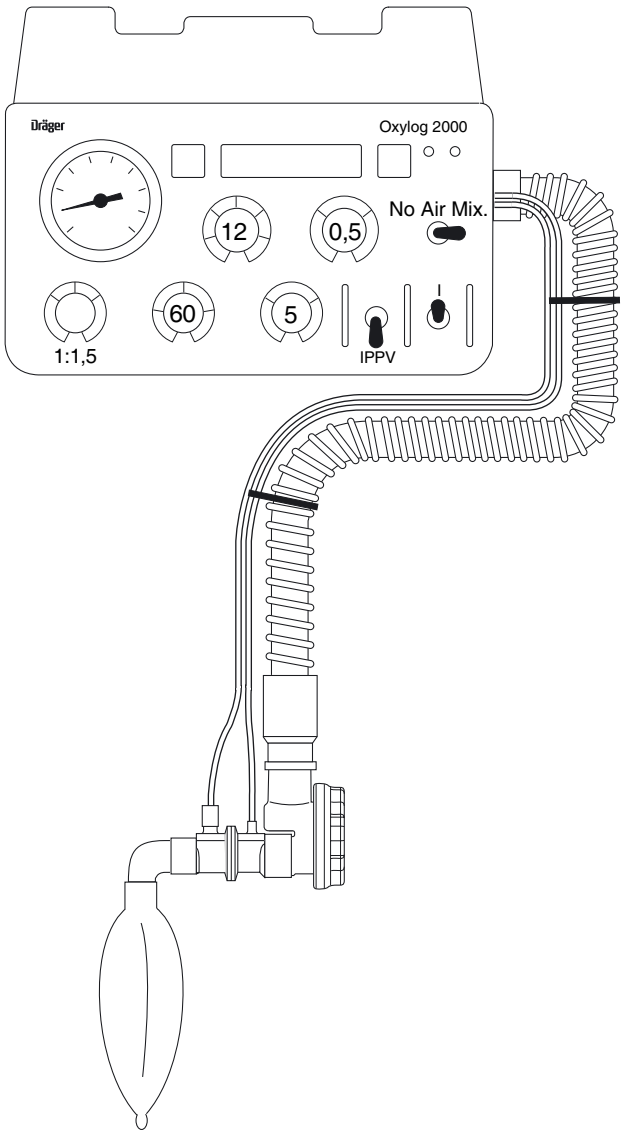
This test list can be processed with standard commercially available test aids and tools, but does not replace the inspections and maintenance work carried out by the manufacturer.

15 Final test

Settings on the device: IPPV, No Air Mix



The minute volume should be 6 ±1 L/min. No alarms should be given. ☐

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16 Handover

- Supply fully functional unit to user/owner. ☐

Date: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ Name: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

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Dräger medical
A Dräger and Siemens Company

2005-11-23

Technical Documentation for Oxylog 2000 according to EMC standard IEC/EN 60601-1-2: 2001

General Information

The EMC conformity of the Oxylog2000 includes the use of following external cables, transducers and accessories:

Description	Order-No.
AC/DC converter	8412074
DC/DC converter	2M86404

The Oxylog 2000 should not be used adjacent to or stacked with other equipment; if adjacent or stacked use is inevitable, the Oxylog 2000 should be observed to verify normal operation in the configuration in which it will be used.

Electromagnetic Emissions

Electromagnetic Emissions		
The Oxylog 2000 is intended for use in the electromagnetic environment specified below. The user of the Oxylog 2000 should assure that is used in such an environment.		
Emissions	**Compliance according to**	**Electromagnetic environment**
RF emissions (CISPR 11)	Group 1	The Oxylog 2000 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
	Class B	The Oxylog 2000 is suitable for use in all establishments including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions (IEC 61000-3-2)	Class A	N/A
Voltage fluctuations / flicker (IEC 61000-3-3)	Complies	N/A

Information re electromagnetic emissions (IEC 60101-1-2: 2001, table 201)

Electromagnetic Immunity

Electromagnetic Immunity			
This Oxylog 2000 is intended for use in the electromagnetic environment specified below. The user of the Oxylog 2000 should assure that is used in such an environment.			
Immunity against	**IEC 60601-1-2 test level**	**Compliance level (of** the Oxylog 2000**)**	**Electromagnetic environment**
electrostatic discharge, ESD (IEC 61000-4-2)	contact discharge: ± 6 kV air discharge: ± 8 kV	± 6 kV ± 8 kV	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
electrical fast transients / bursts (IEC 61000-4-4)	power supply lines: ± 2 kV longer input / output lines: ± 1 kV	± 2 kV ± 1 kV	Mains power quality should be that of a typical commercial or hospital environment.
surges on AC mains lines (IEC 61000-4-5)	common mode: ± 2 kV differential mode: ± 1 kV	± 2 kV ± 1 kV	Mains power quality should be that of a typical commercial or hospital environment.
power frequency magnetic field 50/60 Hz (IEC 61000-4-8)	3 A/m	3 A/m	In close vicinity to the Oxylog 2000, no equipment with extraordinary power frequency magnetic fields (power transformers, etc.) should be operated.
voltage dips and short interruptions on AC mains input lines (IEC 61000-4-11)	dip >95%, 0.5 periods dip 60%, 5 periods dip 30%, 25 periods dip >95%, 5 seconds	>95%, 0.5 per. 60%, 5 per. 30%, 25 per. >95%, 5 sec.	Mains power should be that of a typical commercial or hospital environment. If user requires continued operation during power mains interruptions, it is recommended to power the Oxylog 2000 from an uninterruptible supply or a battery.
radiated rf (IEC 61000-4-3)	80 MHz – 2.5 GHz: 10 (3) V/m	10 V/m	Recommended separation distance from portable and mobile rf transmitters with transmission power P_{EIRP} to the Oxylog 2000 including its lines: 1.84 m * $\sqrt{P_{EIRP}}$ [X1]
rf coupled into lines (IEC 61000-4-6)	150 kHz – 80 MHz: 10 (3) V within ISM bands, 3 V outside ISM bands [X2]	10 V 3 V	Recommended separation distance from portable and mobile rf transmitters with transmission power P_{EIRP} to the Oxylog 2000 including its lines: 1.84 m * $\sqrt{P_{EIRP}}$ [X1]

Information re electromagnetic immunity (IEC 60601-1-2: 2001, tables 202, 203, 204)

[X1]: For P_{EIRP} the highest possible "equivalent isotropic radiated power" of the adjacent rf transmitter has to be inserted (value in Watt). Also in the vicinity of equipment marked with the symbol interference may occur. Field strengths from fixed, portable or mobile rf transmitters at the location of the Oxylog 2000 should be less than 3 V/m in the frequency range from 150 kHz to 2.5 GHz and less than 1 V/m above 2.5 GHz.

[X2]: ISM bands in this frequency range are: 6.765 MHz - 6.795 MHz, 13.553 MHz - 13.567 MHz, 26.957 MHz - 27.283 MHz, 40.66 MHz - 40.70 MHz.

Recommended separartion distances

Recommended separation distances between portable and mobile RF-Telecommunication devices and the Oxylog 2000			
max. P_{EIRP} (W)	**3 V/m distance* (m)**	**1 V/m distance* (m)**	**Hint**
0.001	0.06	0.17	
0.003	0.10	0.30	
0.010	0.18	0.55	
0.030	0.32	0.95	e.g. WLAN 5250 / 5775 (Europe)
0.100	0.58	1.73	e.g. WLAN 2440 (Europe), Bluetooth
0.200	0.82	2.46	e.g. WLAN 5250 (not in Europe)
0.250	0.91	2.75	e.g. DECT devices
1.000	1.83	5.48	e.g. GSM 1800- / GSM 1900- / UMTS- mobiles, WLAN 5600 (not in Europe)
2.000	2.60	7.78	e.g. GSM 900 mobiles
3.000	3.16	9.49	

Information re separation distances (IEC 60601-1-2: 2001, tables 205 and 206)

* 3 V/m distance to transmitters with frequencies from 150 kHz to 2.5 GHz, otherwise 1 V/m distance.

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CE 0344

Directive 93/42/EEC
concerning Medical Devices

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